

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

John Guest et al.

Serial No. 10/539,461

International Application No.
PCT/IB03/05665

International Filing Date
December 22, 2003

For: PAYMENT SYSTEM

Box: PCT

Attention: Office of PCT Legal
Administration

Mail Stop: PCT
Attention: Office of PCT Legal Administration
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**RESPONSE TO DISMISSAL of PETITION UNDER 37 CFR 1.47(b)
and RENEWED PETITION UNDER 37 CFR 1.47(a)**

Dear Sir:

This is in response to the April 27, 2007 dismissal of Applicant's previous response and petition under 37 CFR 1.47 in this application. The present application as originally filed was missing the signed declaration. On May 30, 2006, Applicant submitted papers along with a petition under 37 CFR 1.47(b) detailing the Applicant's efforts to locate the two inventors for which signed declarations were missing. On April 27, 2007, the Office dismissed Applicant's petition on the basis that Applicant's efforts to locate the missing inventors were insufficient and Applicant had not sufficiently proved proprietary interest in the present application.

Upon making further efforts, Applicant has now located the two inventors, obtained one signed inventor declaration, and submits herewith facts and supporting details confirming that the second inventor refuses to sign the second inventor declaration. Accordingly, Applicant renews its petition under 37 CFR 1.47(a) to state that one of the inventors is unwilling to sign the inventor declaration. As this petition is no longer under 37 CFR 1.47(b), Applicant need not respond to the Office's requirement of further proof of the chain of title and the Statement of Proprietary Interest outlined in the Office communication of April 27, 2007.

Per 37 CFR 1.47(a), the address where we reached the non-signing inventor is:

John Guest, c/o Incomm Europe, 1638 Parkway, Solent Business Park, Whiteley Hants
PO 15 7AH, ENGLAND

John Guest's apparent home address is: Tregarth, 5 Old Street, Hill Head, Fareham
Hants PO 14 3HU

Filed herewith is a substitute Combined Declaration and Power of Attorney form with inventor Tagg's signature, and a Statement of Facts related to the attempts to reach the non-signing inventor (John Guest) with supporting documents. The Statement of Facts is signed by a person having first-hand knowledge of the events stated therein. As can be seen from the Statement of Facts, upon discovering the location of the two inventors, Applicant sent appropriate papers to each inventor, including declaration papers. After persistent urging, Applicant obtained the signed declaration of inventor Tagg. However, Applicant could not obtain the signature of inventor Guest. As inventor Guest refused to take Applicant's calls or respond to Applicant's email, and as those co-workers of inventor Guest would not allow direct communication with inventor Guest, and as inventor Guest knew what he was being asked to

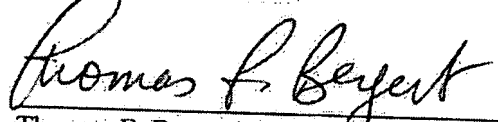
sign, Applicant submits that this non-signing inventor's conduct constitutes a refusal to sign, despite the lack of an express written or oral refusal. See MPEP Section 409.03(d).

It is submitted that the attached documents support the identification of John Guest and Brian Tagg as the inventors of this application; that both inventors have been located; that Brian Tagg has signed the inventor declaration for the present patent application; that John Guest refuses to sign the inventor declaration; and that this response and supporting documentation is in compliance with 37 CFR 1.63 and 1.47. Applicant respectfully requests that this renewed petition be granted for the reasons stated above.

Also attached is Applicant's petition for a 3-month extension of time. The Commissioner is hereby authorized to charge Deposit Account No. 50-0766 in payment of the extension fee and any additional required fees for this renewed petition, with the exception of the issue fee.

Respectfully submitted,

WILLIAMS MULLEN


Thomas F. Bergert, Reg. No. 38,076

WILLIAMS MULLEN
8270 Greensboro Drive
Suite 700
McLean, VA 22102
(703) 760-5200

Attached: (a) Declaration signed by Brian Tagg
(b) Statement of Facts in support of filing for non-signing inventor
(c) supporting documentation for Statement of Facts
(d) petition for 3 month extension of time

Date: September 25, 2007

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration
Submitted
With Initial
Filing

OR

☒ Declaration
Submitted after Initial
Filing (surcharge
(37 CFR 1.16 (e))
required)

Attorney Docket Number	033327.0024
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First Named Inventor	Guest, et al.
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COMPLETE IF KNOWN

Application Number	10/539,461
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Filing Date	12/22/2003
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Art Unit	
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Examiner Name	
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I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Payment System

(Title of the invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY)

12/22/2003

as United States Application Number or PCT International

Application Number

PCT/IB03/05665

and was amended on (MM/DD/YYYY)

06/20/2005

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application ()	Country	Foreign Filing Date (/DD/)	Priority Claimed	Certified Copy Attached?	
				ES	NO
PCT/IB03/05665 0229765.3	PCT	12/22/2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	UK	12/20/2002	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance completing the form, call 1-800-PTO-9199 and select option 2.


Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION — Utility or Design Patent Application

Direct all correspondence to:		<input checked="" type="checkbox"/> The address associated with Customer Number:	01209	OR <input type="checkbox"/> Correspondence address below
Name				
Address				
City		State		ZIP
Country	Telephone		Email	
<p style="text-align: center;">WARNING:</p> <p>Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.</p> <p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p>				
NAME OF SOLE OR FIRST INVENTOR:			<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])			Family Name or Surname	
John			Guest	
Inventor's Signature				Date
Residence: City	State	Country	Citizenship	
Fareham	Hants	UK	UK	
Mailing Address				
Tregarth, 5 Old Street, Hill Head				
City	State	Zip	Country	
Fareham	Hants	PO14 3HU	UK	
<input type="checkbox"/> Additional inventors or a legal representative are being named on the _____ supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.				

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION**ADDITIONAL INVENTOR(S)**
Supplemental SheetPage 3 of 3

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Brian		Tagg	
Inventor's Signature 		Date <u>20 August 2007</u>	
Taunton Residence: City	Somerset State	UK Country	UK Citizenship
The Old Bakery, Cheddon Fitzpaine			
Mailing Address			
Taunton City	Somerset State	TA2 8LN Zip	UK Country
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country

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If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:]	
]	
John Guest et al.]	Box: PCT
]	
Serial No. 10/539,461]	
]	
Filed: December 20, 2002]	
]	
For: PAYMENT SYSTEM]	

STATEMENT OF FACTS IN SUPPORT OF FILING
ON BEHALF OF NON-SIGNING INVENTOR

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This statement is made as to the exact facts that are relied upon to establish the diligent effort made to secure the execution of the declaration by the inventors, Brian Tagg and John Guest, for the above-identified patent application.

IDENTIFICATION OF PERSON MAKING THIS STATEMENT OF KNOWN FACTS

Marie LoPresti
GTECH Corporation
10 Memorial Blvd.
Providence, RI 02903

DETAILS OF EFFORTS TO OBTAIN SIGNATURES OF NON-SIGNING INVENTORS

The undersigned states the following facts:

On or around June 22, 2007, I located a website for Incomm Europe at www.incomm-europe.com that contained information indicating the inventors, John Guest and Brian Tagg, were working for Incomm Europe outside of London, England. On or around June 22, 2007, I prepared packages to each inventor including a copy of the subject patent application, and the respective inventor declaration, with a letter requesting that the declaration be signed and returned immediately.

The packages were sent out via UPS to each inventor with a delivery address at InComm Europe Ltd., 1638 Parkway, Solent Business Park, Whiteley, Hants PO15 7AH United Kingdom. The package to Brian Tagg was also transmitted via facsimile at +44 1489 588498. The package to John Guest did not transmit properly via facsimile to the same number. On or around June 25, 2007, I confirmed that the packages had been delivered on June 25, 2007, and signed for by a person named Osbour. Copies of my cover letters, UPS tracking numbers and confirmations are attached as Exhibit A.

On or around June 25, 2007, I called InComm Europe Ltd. at +44 1489 556700 and spoke with Julia, assistant to both Mr. Tagg and Mr. Guest. Julia acknowledged receiving the fax to Brian Tagg, and acknowledged that both inventors had received the packages. I told her of the urgency of the situation and asked that she have the two inventors sign their respective declaration and return it immediately.

On or around June 27, 2007, I called and left a message for Julia to return my call. On or around July 2, 2007, I called and left another message for Julia to return my call. On or around July 19, 2007, I called and spoke with Julia, who informed me that she was under the impression that the declarations had been signed and returned to us. I assured her that I had not yet received them. She indicated that John Guest was on holiday, however she would check with Brian Tagg and get back to me.

On or around July 27, 2007, I called and spoke with Julia. She put me on hold, indicating that she was going to check with Brian Tagg right then. She told me that he pulled the declaration out of the bottom of his drawer and said that it was not a problem, that he would sign it and return the declaration to us within a few days. Julia said that John Guest would be back from holiday the middle of the following week.

On or around August 3, 2007, I spoke with a person named Sarah, who informed me that Julia was not in. She said she asked John Guest about the declaration, and then said they would fax the declarations back on Monday. I gave her my fax number. On or around August 10, 2007, I called again and was informed by a person named Christian that John Guest was traveling abroad, Brian Tagg was on holiday, and Julia was gone for the day. Christian said he would call Brian Tagg and find out about the documents. He would either call me back that day or the following Monday.

On or around August 20, 2007, I called and again spoke with Sarah. I first asked for Brian Tagg. After being put on hold, I was told that Brian Tagg was unavailable. I asked for John Guest. I was put on hold. I was then told that he was on the phone. I asked to hold for him. I was again put on hold and then told that he was on a conference call. I asked Sarah to have them return my call and let me know if I would be receiving the signed declarations. Later on August 20, 2007, I received a fax of the declaration signed by Brian Tagg, but no declaration from John Guest.

On or around August 21, 2007, I called the company and again spoke with Sarah. She informed me that she would ask about John Guest's declaration and indicated that she was just

putting Brian Tagg's original declaration in the mail. On or around August 23, 2007, I called the company and again spoke with Sarah. She asked if Julia, Mr. Guest's personal assistant, could call me back, and said that she would do her best to get John Guest's signed declaration to me.

On or around August 27, 2007, I called InComm and was informed that John Guest was not in. When I asked for his mobile phone number, the individual I spoke to refused to give it to me.

On or around August 27, 2007, I obtained Mr. Guest's e-mail address and e-mailed Mr. Guest a copy of the Declaration with my request that he sign and return it to me. I also used the "read receipt" function from my e-mail manager, which returned an e-mail to me on August 28, 2007 saying that Mr. Guest had received my e-mail. A copy of my e-mail and read receipt is attached as Exhibit B. I have received no response to my e-mail of August 27, 2007.

On or around the middle of September I called InComm again, to try to speak with John Guest; however, I could not get past the individual screening his calls to speak with him directly. Over the course of my many phone calls, I did not receive any positive indications from co-workers of Mr. Guest that he intended to sign and return his inventor declaration.

In light of my many unsuccessful efforts to have Mr. Guest sign and return his inventor declaration, I do not believe he will do so.

Date: 9/20/07

GTECH Corporation

By: Marie LoPresti

Printed Name: Marie LoPresti

Title: IP Paralegal

Attached: Exhibit A: copies of letters, UPS tracking numbers and confirmations
Exhibit B: copy of email and return receipt from August 2007

1494628

EXHIBIT A



June 22, 2007

VIA UPS

Brian Tagg
Chief Operating Officer
InComm Europe Ltd
1638 Parkway
Solent Business Park
Whiteley, Hants PO15 7AH

GTECH Center
10 Memorial Boulevard
Providence, Rhode Island
02903
Telephone 401 392-1000
Fax 401 392-0391

Re: US Patent Application No. 10/539,461 claiming priority to GB0229765.3
Title: Payment System

Dear Mr. Tagg:

Attached is a copy of an Assignment Agreement entered into by you, John Guest, Radicall Projects Limited and Inca Payments Limited in connection with the above-referenced patent application. A copy of the corresponding PCT application is also attached for your convenience.

The United States Patent and Trademark Office is requiring that a signed Declaration of Inventors be filed by June 27, 2007 in connection with this matter. I have attached a copy of the Declaration and ask that you confirm your inventor information, sign and date the document where indicated, and immediately fax to my attention at 401.392.0391. Should any of the inventor information be incorrect, please make the appropriate changes and initial each change. Please also return the originally executed Declaration to my attention as soon as possible. A return UPS package is enclosed herewith for your convenience.

I appreciate your immediate attention to this matter. Please feel free to contact me at 401.392.7373 if you have any questions.

Please feel free to contact me at 401.392.7373 if you have any questions.

Kind regards,

Marie LoPresti
IP Paralegal
GTECH Corporation

Enclosures

**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

☐ Declaration
Submitted
With Initial
Filing

OR

☒ Declaration
Submitted after Initial
Filing (surcharge
(37 CFR 1.16 (e))
required)

Attorney Docket
Number

033327.0024

First Named Inventor

Guest, et al.

COMPLETE IF KNOWN

Application Number

10/539,461

Filing Date

12/22/2003

Art Unit

Examiner Name

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Payment System

the specification of which

(Title of the Invention)

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY)

12/22/2003

as United States Application Number or PCT International

Application Number

PCT/IB03/05665

and was amended on (MM/DD/YYYY)

06/20/2005

(if applicable).

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I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application ()	Country	Foreign Filing Date (/DD/)	Priority Claimed	Certified Copy Attached?	
				YES	NO
PCT/IB03/05665 0229765.3	PCT	12/22/2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	UK	12/20/2002	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]
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If you need assistance completing the form, call 1-800-PTO-9199 and select option 2.

DECLARATION — Utility or Design Patent Application

Direct all correspondence to:



The address associated with Customer Number:

01209

OR



Correspondence address below

Name

Address

City

State

ZIP

Country

Telephone

Email

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR:

Given Name (first and middle [if any])



A petition has been filed for this unsigned inventor

John

Family Name or Surname

Inventor's Signature

Guest

Date

Residence: City

State

Country

Citizenship

Fareham

Hants

UK

UK

Mailing Address

Tregarth, 5 Old Street, Hill Head

City

State

Zip

Country

Fareham

Hants

PO14 3HU

UK



Additional inventors or a legal representative are being named on the supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.

DECLARATION

ADDITIONAL INVENTOR(S) Supplemental Sheet

Page 3 of 3

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Brian		Tagg	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
The Old Bakery, Cheddon Fitzpaine			
Mailing Address			
City	State	Zip	Country
Taunton	Somerset	TA2 8LN	UK
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country

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If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

CLIFFORD
CHANCE

LIMITED LIABILITY PARTNERSHIP

RADICAEL PROJECTS LIMITED

AND

JOHN GUEST

AND

BRIAN TAGG

AND

INCA PAYMENTS LIMITED

IP ASSIGNMENT AGREEMENT

THIS AGREEMENT is made on 24 June 2003.

BETWEEN:

- (1) RADICALL PROJECTS LIMITED, a company incorporated in England (registered no. 4479900), whose registered office is at Stansted House, Hampshire PO9 6DX, United Kingdom (the "Assignor");
- (2) JOHN GUEST of Tregarth, 5 Old Street, Hill Head, Fareham, Hants PO14 3HU;
- (3) BRIAN TAGG of The Old Bakery, Cheddon Fitzpaine, Taunton, Somerset TA2 8LN (together with John Guest, the "Inventors" and each an "Inventor"); and
- (4) INCA PAYMENTS LIMITED, a company incorporated in England (registered no. 4724859), whose registered office is at Link House, 19 Colonial Way, Watford, Hertfordshire WD24 4JL United Kingdom (the "Assignee").

THE PARTIES AGREE as follows:

RECITALS:

- (A) The Inventors claim to have transferred their interest in the Payment System Patent Application to the Assignor.
- (B) In the event that the Inventors have retained any right, title or interest in the Payment System Patent Application, the Inventors now wish to transfer any such right, title and interest to the Assignee.
- (C) In the event that the Assignor or an Inventor owns any patent or design rights relating to the Inca Services (whether registered or unregistered) (including, without limitation, the Payment System Patent Application) which it has not already assigned to the Assignee it now also wishes to assign those rights to the Assignee.
- (D) The Assignor and the Inventors may own certain copyright which the Assignee requires in order to provide the Inca Services, and to the extent that they have not already assigned the same to the Assignee, they now wish to do so.

1. DEFINITIONS

1.1 In this Agreement (including in the recitals to this Agreement):

"Act" means the Copyright, Designs and Patents Act 1988 as modified or re-enacted or both from time to time whether before or after the date of this Agreement;

"Applications" means any applications by the Assignor or an Inventor (whether legally or beneficially and whether solely or jointly with another party or person and wherever subsisting in the world) to register any patents relating to, used or exploited or capable of being used or exploited in connection with the Inca Services including the Payment System Patent Application and any right to make such application;

"Designs" means the registered designs and unregistered design rights and any applications for designs.

exploited in connection with the Inca Services and any right to make such an application (if any) which the Assignor or an Inventor may at the date of this Agreement own (whether legally or beneficially and whether solely or jointly with another party or person and wherever subsisting in the world);

"Inca Services" means the services related to or connected with the use of two-dimensional barcode, magnetic stripe and "e-voucher" technologies together with other technologies to facilitate the use of retail electronic networks for the purpose of permitting the prepayment of mobile telephone services;

"Patents" means together the Applications and the Registered Patents and any registered patents or patent applications deriving priority therefrom relating to, used or exploited, or capable of being used or exploited in connection with the Inca Services;

"Payment System Patent Application" means the UK patent application specified in the Schedule to this Agreement;

"Registered Patents" means any United Kingdom registered patents (if any) owned by the Assignor or an Inventor (whether legally or beneficially and whether solely or jointly with another person or parties) relating to, used or exploited or capable of being used or exploited in connection with the Inca Services;

"Works" means all code, source code and other software (including, without limitation, all modules, routines and sub-routines and all source and other preparatory materials relating to them, including functional specifications and programming specifications, programming languages, algorithms, flow charts, logic, logic diagrams, orthographic representations, file structures, coding sheets and coding), any user manuals, design documentation, process documentation, test plans and all other documentation relating to the Inca Services.

1.2 References in this Agreement to the masculine gender shall include the feminine and neuter genders.

2. ASSIGNMENT

In consideration of the sum of £1 now paid by the Assignee to the Assignor and each Inventor (the receipt of which the Assignor and the Inventors each hereby acknowledge), each of the Assignor and each Inventor hereby assigns to the Assignee absolutely, as legal and beneficial owner and with full title guarantee, all of its rights, title and interest (if any) in and to:

2.1 all copyright and other rights of a similar nature in the Works (wherever subsisting in the world) including, without limitation:

2.1.1 the exclusive right to do and to authorise others to do the acts restricted by Part 1 of the Act in relation to the Works in the United Kingdom;

2.1.2 all rights of a similar nature to those described in clause 2.1.1 conferred in respect of the Works by the laws in force in all other countries; and

- 2.1.3 the right to sue for and to recover damages and other remedies in respect of any infringement of the copyright in the Works which may have occurred before the date of this Agreement; and
- 2.2 the Patents, including, without limitation:
 - 2.2.1 its right, title and interest (if any) in and to the Applications with the intent that the grant of any patents pursuant to the Applications will be in the name of and will vest in the Assignee;
 - 2.2.2 any rights the Assignor or an Inventor may have to make any further Application (if any) with the intent that the Application may be made in the Assignee's name and the grant of any patents pursuant to the Applications will be in the name of and will vest in the Assignee;
 - 2.2.3 all the rights, powers, liberties and immunities conferred on the applicant for or registered proprietor of the Patents, free from all liens, charges and encumbrances;
 - 2.2.4 the right to sue for and to recover damages and other remedies in respect of any infringement of the Patents or other acts carried out by another person within the scope of the claims of any published specification of any of the Patents which may have occurred before the date of this Assignment; and
 - 2.2.5 all of its rights to apply for, prosecute and obtain patents or similar rights or protection in respect of any of the inventions forming the subject-matter of the Patents in any country of the world (including the right to claim priority from the Patents); and
- 2.3 all of its rights, title and interest (if any) to the Designs at the date of this Agreement including:
 - 2.3.1 the right to do and to authorise others to do the acts restricted by Part III of the Act in relation to the Designs in the United Kingdom; and
 - 2.3.2 the right to sue for and to recover damages and other remedies in respect of any infringement of the Designs which may have occurred before the date of this Assignment.
- 3. **FURTHER ASSURANCE**
 - 3.1 The Assignor and the Inventors shall on request by the Assignee in writing and at the Assignee's expense do and execute or arrange for the doing and executing of, each necessary act, document and thing to implement the assignments provided for in this Agreement.
 - 3.2 The Assignor and the Inventors shall, at the Assignee's expense, give all such assistance as the Assignee may reasonably request to complete the registration of:
 - 3.2.1 any Application existing at the date of this Agreement;

3.2.2 any future patent application deriving its priority date from a Registered Patent or an Application;

3.2.3 any future application for the registration of any Designs.

4. **GOVERNING LAW**

This Agreement is governed by English law.

SCHEDULE

Country

United Kingdom

Application Number

GB0229765.3

Application Date

20 December 2002

EXECUTED by the parties

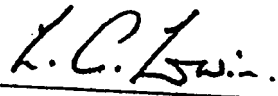
Signed by
a duly authorised
representative of
RADICALL PROJECTS LIMITED:

NICHOLAS NEARING-SMITH
DIRECTOR

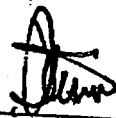
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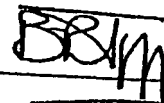
LESLIE G. LOWIN
DIRECTOR

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JOHN GUEST

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Signed by
BRIAN TAGG

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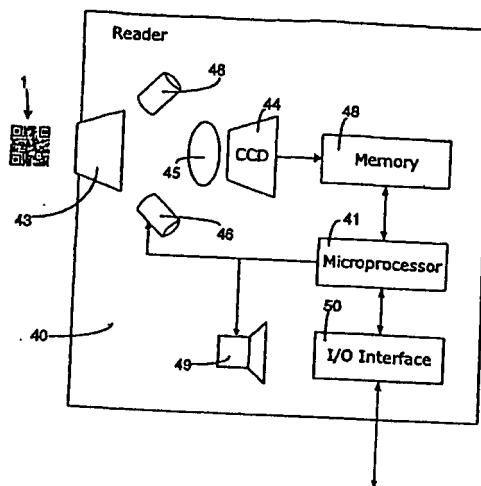
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- (71) Applicant (for all designated States except US): INCA
PAYMENTS LIMITED [GB/GB]; Link House, 19 Colo-
nial Way, Watford, Hertfordshire WD24 4JL (GB).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): GUEST, John
[GB/GB]; Tregarth, 5 Old Street, Hill Head, Fareham,
Hants PO14 3HU (GB). TAGG, Brian [GB/GB]; The Old
Bakery, Cheddon Fitzpaine, Taunton, Somerset TA2 8LN
(GB).
- (74) Agent: HOWE, Steven; Lloyd Wise, Commonwealth
House, 1-19 New Oxford Street, London WC1A 1LW
(GB).
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Declarations under Rule 4.17:

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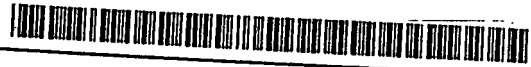
(54) Title: PAYMENT SYSTEM



(57) Abstract: The credit a mobile radio apparatus account, the display (15) of the a mobile telephone (10) is used to display an image including a barcode (1) which graphically represents transaction data. This includes data identifying a transaction database records in a transaction database (75), the transaction database records including data identifying the mobile radio apparatus account. An account database (83) comprises account database records of mobile radio apparatus accounts including an amount of credit. A retail terminal (30) provided in a retail location has a reader (40) which reads the barcode (1). The retail terminal (30) accepts payment and communicates the read transaction data and data indicating that payment has been accepted to a transaction control system remote from the retail terminal (30). The transaction database (75) is updated to indicate that payment has been accepted and the account database (83) is updated to credit the mobile radio apparatus account by the payment amount.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Payment System

The present invention relates to a payment system and method allowing consumers to make payments at retail locations. It relates in particular to the use of technical means to facilitate the transaction, Whilst the invention relates specifically to payments for crediting an account for a mobile radio apparatus, such as a mobile telephone, it is also more generally applicable to payment for other products.

Mobile telephones are now a very common consumer product. In many countries, a popular type of payment arrangement for a mobile telephone is for the user to make payments to credit their account in advance of using the mobile telephone. This type of payment arrangement is commonly known as "pre-pay". The process of making a payment and crediting the user's account is commonly known as a "top-up", which term reflects the normal manner of usage in which the user frequently tops up their account by relatively small amounts.

Pre-pay is very popular. For example, in the United Kingdom, since the introduction of pre-pay mobile services in 1995, the market has grown rapidly to over 30 million users, each on average topping up their phone around eight times a year.

Pre-pay systems allow the user to make payments at a variety of retail outlets, thereby allowing the user to pay for a top-up at a location which is convenient to them.

The original top-up system involves the purchase of a voucher which is subsequently used to credit a mobile telephone account. The voucher system involves the purchase of a voucher bearing a PIN (of up to 16 digits) at a retail outlet. It requires a telephone call to an interactive voice response (IVR) system and entry of the PIN on the mobile telephone to validate the voucher prior to crediting the account of the mobile telephone.

As the market expanded, the logistical complexity of maintaining the voucher system has led mobile network operators to seek more effective alternatives. The large number of vouchers and associated transactions has led to increased costs in managing the system, in particular to reduce the opportunities for fraud and system abuse.

More recently, electronic payment systems of crediting a mobile phone account have been developed. The first electronic payment system in the United Kingdom was introduced in 1999. This system used magnetic stripe cards in which limited user details were contained within a magnetic stripe. Such a magnetic stripe card payment system involves the distribution of cards bearing a PAN (of up to 19 digits), and requires a call to an IVR system and entry of the PAN on the mobile telephone for validation of the card. Thereafter, the magnetic stripe is read when payment is made by swiping the card through a reader in a retail outlet to identify the mobile telephone account.

Despite intense efforts by the mobile network operators to promote such an electronic payment system, there has not been a great take-up by consumers. Currently in the United Kingdom, the voucher payment system dominates, accounting for approximately 70% of all pre-pay top-up sales, which amounts to an estimated 170 million sales per year. Consumer research suggests that the failure of payment systems including magnetic stripe cards to provide an acceptable alternative to paper vouchers is due to an inherent resistance by users to initially pre-register their personal details, combined with the inconvenience of carrying a separate magnetic stripe card leading to failure to do so.

The present invention has been developed as an alternative payment system and method and involves the use of different technical means from those described above to effect payment for crediting a mobile radio apparatus account.

According to a first aspect of the present invention, there is provided a method of crediting a mobile radio apparatus account using:

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of data;

a retail system having a reader capable of reading graphically represented data displayed on said display of said mobile radio apparatus; and

a transaction control system remote from the retail system, the retail system and the transaction control system being capable of communicating over a communications link, the transaction control system storing account database

records of mobile radio apparatus accounts, each account database record including an amount of credit; and

the method comprising:

displaying on the display of the mobile radio apparatus an image including a graphical representation of transaction data which includes data corresponding to an account database record;

using the reader of the retail system to read the graphically represented transaction data displayed on the display of the mobile radio apparatus;

using the retail system to accept a payment;

communicating from the retail system to the transaction control system, the read data corresponding to an account database record and data indicating that payment has been accepted;

updating the account database record corresponding to the communicated data to credit the mobile radio apparatus account by the payment amount.

According to a second aspect of the present invention, there is provided a payment system for crediting a mobile radio apparatus account comprising:

a transaction control system storing account database records of mobile radio apparatus accounts, each account database record including an amount of credit; and

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of transaction data which includes data corresponding to an account database record;

a retail system remote from the transaction control system; and

a communications link between the retail system and the transaction control system,

the retail system comprising:

a reader capable of reading graphically represented transaction data displayed on said display of said mobile radio apparatus;

payment means for accepting a payment; and

means for communicating the read data corresponding to an account

...database record and data indicating that payment has been accepted over the communications link to the transaction control system;

the transaction control system comprising account update means for updating the account database record corresponding to the communicated data to credit the mobile radio apparatus account by the payment amount.

To identify a desired transaction, the present invention uses the mobile radio apparatus to display an image including a graphical representation of transaction data. The transaction data corresponds to an account database record which is a record of the desired transaction stored remotely from the retail system. The image is displayed by the user to the reader of a retail system to read the graphically represented data and payment is accepted using the retail system. The data corresponding to an account database record, read as part of the transaction data, and also data indicating that payment has been accepted, is communicated from the retail system to the transaction control system. This communicated data is then used to update the account database record to credit the account by the payment amount. Thus, the image displayed on the mobile radio apparatus is used to identify the account which is to be credited. This provides for safe and reliable payments.

The payment is accepted by a retail system which may be any system capable of accepting a payment. Typically, the retail system will include a retail terminal, such as a terminal of a type currently used in retail outlets. The retail terminal may be arranged to implement the entire payment process and the communication with the transaction control system. In this case, the retail system is constituted by the reader and the retail terminal together. However, this is not essential and the various functions of the retail system may be implemented in separate units. For example, the retail system may comprise a combination of a conventional retail terminal which implements the payment process and an additional terminal which implements the communication with the transaction control system. In this case, the additional terminal may be connected to the reader. This arrangement is advantageous in that it allows the present invention to be invented by a retail terminal already provided in a retail outlet, but by adding the additional terminal and reader.

Alternatively, some of the payment processing may occur remotely from the retail terminal. For example, the retail system may comprise a retail terminal which can communicate with a host server, e.g. over a local area network. In this case, the host server may perform the payment process and the retail terminal primarily acts to control the interaction with the consumer through appropriate data input means such as a keyboard or touch screen and/or means for reading a credit card. Whatever the nature of the retail system, it includes some means for accepting payment from the consumer.

The payment may be in any form, for example by cash or by credit card. In the case of a cash transaction, where a retail terminal implements the payment processing, the means for accepting payment may be the keyboard and associated processing which allows physical receipt of cash to be confirmed by appropriate operation of keys on the keyboard. In the case of an unmanned retail terminal, the means for accepting payment may be an appropriate mechanical system, for example as used in known vending machines. In the case of payment by credit card, the means for effecting payment may be a conventional device for reading data stored on the credit card or entering the number of the credit card, and the associated processing.

Retail terminals may be provided in a large number of locations, for example, in retail outlets such as shops, or any other establishment where payment may be accepted, such as a ticket booth. Alternatively, the possibility of the retail terminal being unmanned allows retail terminals to be provided at a larger number of locations.

The reader may be provided as an integral part of the retail terminal or may be a separate unit connected to the retail terminal.

The present invention provides a payment system which provides advantages to each of the users, the retailers and the mobile network operators.

As far as users are concerned, the present invention provides the advantage of simplicity of use and understanding. There is no need to use anything other than the mobile radio apparatus itself. There is no need to purchase a voucher or to carry a magnetic stripe card. The user needs merely to visit a retail outlet or other location

having a retail system, to display the image including the graphical representation of data and to make the payment. These are all routine tasks. In particular, display of the image may be achieved using existing functionality of the mobile radio apparatus. Users do not need to enter a PIN as is necessary for validation in voucher payment systems or a PAN as is necessary for validation of the magnetic stripe card of the electronic payment system. This is because the graphically represented data corresponds to an account database record.

It is therefore expected that the present invention will be readily accepted by consumers.

From the point of the retailer, the system is again simple to use and understand. The retailer simply uses a reader to read the displayed image. This requires relatively little retailer training because it is a straightforward task, similar to that routinely used to read barcodes to identify products in many shops such as supermarkets. Thereafter, the retailer need only control the retail system to accept the payment, in the same manner as for any other purchase, for example by accepting cash or a credit card payment. Indeed, the task at the retailer is so straightforward that it is possible to implement an automatic retail terminal which is operated directly by the consumer using technology similar to that in a vending machine to accept payment. Also, the retailer does not need to hold any stock as is necessary with the voucher payment system. Thus the retailer never has voucher supply problems and there is a reduced risk of fraud to the retailer.

As far as the mobile network operators are concerned, a significant advantage is that a high take-up by users and retailers is likely due to the advantages described above. In addition, the payment system is simple to implement. There is no need to manufacture and distribute vouchers or electromagnetic cards. There is no need for an IVR system for validation. It is expected that a payment system in accordance with the present invention will be cheaper to implement than the existing payment systems described above.

Also, the present invention provides a relatively flexible system which can be adapted, for example to change the payment amount or to introduce conditions on desired transactions, as will be described further below.

It is also noted that the present invention does not necessitate changes to the mobile radio apparatus, such as new or updated software or SIM changes (although these might be useful optional features). This is because the present invention uses an image which may be displayed using the existing functionality of the mobile radio apparatus to display images. As the images are read passively, there is no need for any form of active transmission of data such as infrared transmission or electromagnetic transmission, e.g. Bluetooth.

Preferably, the transaction control system further stores transaction database records of desired transactions for respective mobile radio apparatus accounts, and said data corresponding to an account database record included in said transaction data is data which identifies a transaction database record.

The use of transaction database records, in addition to account records, has the advantage that the transaction database records store information about the desired transaction. This may be used to facilitate the transaction. For example, the transaction database record might include the payment amount or conditions which might be used at the time when payment is accepted. In this case, the data included in the graphically represented transaction data displayed on the mobile radio apparatus identifies a transaction database record. It therefore corresponds to an account database record because the identified transaction database record contains information about a transaction in respect of a particular mobile radio apparatus account.

However, it is not essential to implement the present invention using a transaction database record. Instead, the data included in the graphically represented transaction data displayed on the mobile radio apparatus may directly identify an account database record.

Preferably, the transaction control system stores the account database records and the transaction database records in an account database and a transaction database, respectively, which databases are separate from each other, each transaction database

record including an account number identifying an account database record in the account database, the transaction control system further comprises extraction means for extracting, from the transaction database record identified by the communicated data, the account number of a mobile radio apparatus account in the account database, and the account update means is arranged to update, in the account database, the account database record identified by the account number extracted from the transaction database.

The use of a separate account database and transaction database is advantageous, because it allows the present invention to be implemented using an existing account database of a mobile network operator, by newly introducing a transaction database. It also allows the present invention to be implemented using a single transaction database in combination with plural account databases, for example for different mobile network operators. This in turn facilitates implementation of the present invention in a common manner for different mobile networks. Lastly, the use of a separate transaction database facilitates the application of the present invention to several different products besides crediting a mobile radio apparatus account (as discussed in more detail below) using a single transaction database.

To implement the account database and transaction database separately, the databases may be provided in a separate account server and transaction server, respectively, with a communications link therebetween.

However, it is not essential to provide the transaction database and account database separately. Alternatively, the transaction database records could be provided in the same database as the account database records, for example by the transaction database records each forming part of a respective account database record in respect of a particular account.

Preferably, the image is a message received by the mobile radio apparatus. For supplying the message, the transaction control system may include transmission means for transmitting a message comprising an image including a graphical representation of transaction data which includes data corresponding to an account database record.

Supplying the image as a message takes advantage of the existing messaging functionality of the mobile radio apparatus. This allows straightforward storage of the images, because storage of received messages is an integral part of the existing messaging functionality. Thus, the present invention may be achieved without any special software on the mobile radio apparatus. It also provides for ease of use by the user.

The transmission of the graphical representation of data in a message, also allows additional content to be included in the message, together with the graphically represented data. In general, the additional content may be of any nature, including advertising material or other information addressed to the user. This conduit for additional content is of particular advantage to the mobile network operator.

The present invention may use any type of messaging for transmitting a message to a mobile radio apparatus. Currently, SMS messaging is preferred, but other types of messaging are equally possible, for example MMS, EMS or WAP.

Despite the advantages of the image being transmitted in the form of a message, this is not essential. It would alternatively be possible to transmit the transaction data to the mobile radio apparatus in a data format, from which the mobile radio apparatus would generate the graphical representation. This would, however, require appropriate software to be provided on the mobile radio apparatus.

Preferably, the messaging means further includes reception means for receiving a request message from the mobile radio apparatus indicative of the desire to credit the mobile radio apparatus account of the mobile radio apparatus, the transaction control system further includes transaction database record creation means, responsive to the receipt of a message by said reception means, for creating a transaction database record including the data identifying the account of the mobile radio apparatus from which a message is received, and said transmission means is responsive to the creation of a transaction database record by said transaction database record creation means for transmitting a message comprising an image including a graphical representation of transaction data which includes data identifying the created transaction database record.

In this way, both the transaction database record and the message including the graphical representation transaction data are created in response to a request message from the mobile radio apparatus.

This technique also allows accurate recording of the correct telephone number, or other data identifying the account, for the desired transaction in the transaction database record, because the mobile radio apparatus may be identified directly from the request message.

The request message also provides the advantage of providing a simple mechanism by which the user can register the desire to credit the account simply by sending a request message to a predetermined number.

One possibility is for the request message to be blank so that mere receipt of a message at a predetermined telephone number indicates the desire to credit the account. In this case, different telephone numbers might be used to designate different payment amounts, or the payment amount might not be specified at all. Another possibility is for the text message to include simple text identifying the desired payment amount.

However, the use of such a request message is not essential. A request could be made by any other means, for example a voice call. Alternatively, messages including the graphical representation of data could be transmitted to mobile radio apparatuses in an unsolicited manner.

There are several ways for the retail system to identify the payment amount, as follows:

A first option for identifying the payment amount is that the transaction data further includes the payment amount and the payment means is arranged to accept the payment of the payment amount read as part of the transaction data. This option is advantageous in that it avoids the need to obtain the desired payment amount from the transaction database record. It therefore speeds up the payment process.

A second option for determining the payment amount is that each transaction database record includes the payment amount, the transaction control system includes retrieval means, responsive to the data identifying a transaction database record

communicated from the retail system, for retrieving the payment amount from the transaction database record identified by the communicated data and communicating the retrieved payment amount to the retail system, and the payment means is arranged to accept the payment of the payment amount communicated from the transaction control system.

This option has the advantage of the payment amount being automatic and accurately supplied to the retail system from the relevant transaction database record.

A third option is for the user to specify the payment amount. In this case, the retail system has input means for inputting the payment amount during the payment processing. Similarly, this third option could be applied to change the payment amount identified using the first or second options. If the payment amount is specified by the user, then it is communicated from the retail system to the transaction control system in a similar manner to the data identifying a transaction database record and the data indicating that payment has been accepted.

Advantageously, the transaction control system includes authorization means, responsive to the data identifying a transaction database record communicated from the retail system, for checking the transaction database record identified by the communicated data and communicating an authorization to the retail system if a predetermined criterion is met, and the payment means is arranged to inhibit payment until receipt of the authorization by the retail system.

Inclusion of such an authorization process is advantageous because it allows the transaction to be controlled by the transaction control system. A wide variety of predetermined criterion may be used, from a simple check that a proper transaction database record is identified to checking whether conditions specified in the transaction database record are met. Numerous conditions are possible. For example, the conditions might specify a particular time period outside which the authorization is not to be provided, to enable the transaction database records to "expire" at a certain date.

Thus, it can be seen that such an authorization process can provide a wide, flexible range of additional functions which can reduce both errors and fraud, and/or can provide additional functionality to the payment system.

The present invention is particularly applicable to a mobile radio apparatus in the form of a mobile telephone, but may equally be applied to any other form of mobile radio apparatus, for example a portable digital assistant or indeed any apparatus capable of radio communication over a mobile network.

Preferably, the graphical representation is a two-dimensional barcode. Two-dimensional barcodes are conventional in themselves. Their use with the present invention allows known technology to be applied to form and read the graphically representation of the transaction data. The use of a two-dimensional barcode also provides the advantage of being able to represent large amounts of information in a restricted area.

Any format for the two-dimensional barcode may be applied. Preferably the barcode format is QR Code, but other possible formats include PDF417, Code 16K, Code 49, DataMatrix, Maxicode, Code One or Aztec Code. Although a stacked two-dimensional barcode may be used, preferably a matrix two-dimensional barcode is used because of the inherent advantages of increasing the amount of data stored. The ability to store large amounts of data also provides the advantage that the barcodes may incorporate error correction capability to allow recovery from data corruption, as well as other encoding algorithms, for example to enhance security.

Optionally, the graphically represented data may be encrypted.

While two-dimensional barcodes are preferred, the graphical representation of data may be in any other format which allows the data to be read by a reader at the retail system. This includes one-dimensional barcode or, representation of the data by characters to be read by a reader incorporating an optical character recognition system.

The present invention is described above as a payment system and method for crediting an account of a mobile radio apparatus. However, the present invention may equally be applied to payment for products other than the crediting of an account for a mobile telephone apparatus. Indeed, the present invention may be applied to payment for any products, including tangible products such as goods, including ticketing, and intangible products such as services.

Thus, in accordance with a third aspect of the present invention there is provided a method of payment for a product using:

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of data;

a retail system having a reader capable of reading graphically represented data displayed on the display of said mobile radio apparatus; and

a transaction control system remote from the retail system, the retail system and the transaction control system being capable of communicating over a communications link, the transaction control system storing transaction database records of desired transactions each including data identifying a desired product,

the method comprising:

displaying on the display of the mobile radio apparatus an image including a graphical representation of transaction data which includes data identifying a transaction database record;

using the reader of the retail system to read the graphically represented transaction data displayed on the display of the mobile radio apparatus;

using the retail system to accept a payment;

communicating from the retail system to the transaction control system, the read data identifying a transaction database record and data indicating that payment has been accepted;

updating the transaction database record identified by the communicated data to indicate that payment has been accepted; and

delivering the product identified in the identified transaction database record.

According to a fourth aspect of the present invention, there is provided a payment system comprising:

a transaction control system storing transaction database records of desired transactions each including data identifying a desired product;

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of transaction data which includes data identifying a transaction database record;

a retail system remote from the transaction control system; and
a communications link between the retail system and the transaction control system,

the retail system comprising:

a reader capable of reading graphically represented transaction data displayed on the display of the mobile radio apparatus;

payment means for accepting a payment; and

means for communicating the read data identifying a transaction database record and data indicating that payment has been accepted over the communications link to the transaction control system;

the transaction control system comprising:

means, responsive to the data communicated from the retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted.

Similarly, the various features of the present invention as applied to crediting an account for a mobile radio apparatus may be generalized to any other products as follows. Instead of maintaining and updating account database records, appropriate means for delivering the product in question are provided. The manner of delivery will depend on the product in question, but includes generating an order for a supplier to supply a product, communication of data to instruct a service provider to provide a service, or where a product is intangible and represented by database records, updating that database record.

When applied to payments for products in general, the present invention provides the same advantages as described above with reference to crediting an account for a mobile radio apparatus. The present invention is particularly useful in that it provides a mechanism for allowing a consumer to pay for a product at any of a large number of retail locations, but without the retailer needing to be involved in the delivery of the product.

To allow better understanding, an embodiment of the present invention will now be described by way of non-limitative example with reference to the accompanying drawings, in which:

Fig. 1 is a two-dimensional barcode which constitutes graphically represented data;

Fig. 2 is a schematic diagram of the payment system which embodies the present invention;

Fig. 3 is a schematic view of a barcode reader; and

Fig. 4 is a perspective view of an illumination unit of the barcode reader of Fig. 3 viewed from inside the reader.

A payment system which embodies the present invention is described below.

In the payment system, the graphical representation of data is a two-dimensional barcode, in particular a matrix barcode in the format known as QR Code. Fig. 1 illustrates an example of such a QR code barcode 1. QR Code is defined in ISO/IEC 18004. QR Code has the advantage of providing an error correction capability to allow recovery from data corruption during the reading process. QR Code is capable of representing large amounts of data with a high data density. QR Code also includes the provision of position detection patterns on three comers which allows omni-directional reading.

Handling of the QR Code barcode 1 may be performed using known techniques in accordance with the QR Code format. The payment system uses a known encoding algorithm for encoding a data string into a QR Code barcode 1 graphically representing that data string. Similarly, the present invention uses known technology for reading the barcode. As will be described in more detail below, this involves detecting an image of the barcode, and decoding the image data using a known decoding algorithm for QR Code to obtain the graphically represented data.

The payment system is illustrated schematically in Fig. 2. In particular, Fig. 2 shows the elements of the payment system, including various functional blocks included therein.

—The payment system includes a mobile radio apparatus in the form of a mobile telephone 10. The mobile telephone 10 is of known construction. It includes a radio communication circuit 11 for providing communication with a mobile network 20 which is also of known form. In particular, the mobile network 20 consists of a number of distributed base stations which may be interconnected by land-lines, which ultimately interface to other switched networks such as the Public Switched Telephone Network (PSTN). The radio communication circuit 11 communicates with a local base station to provide radio communication between mobile telephone 10 and the mobile network 20. The mobile network 20 may be one of the existing mobile networks, for example in the case of the United Kingdom those currently operated by Vodafone, Orange, T-mobile or O₂. Of course the payment system may include many mobile telephones 10, which may operate over different mobile networks 20.

The mobile telephone 10 also comprises a microprocessor 12, a memory 13, a keyboard 14 which acts as an input means for the user, and a display 15.

The microprocessor 12 runs software to control operation of the mobile telephone 10, providing a variety of functions. One of the functions is to receive and handle messages, in an SMS format or any other messaging format. SMS stands for Short Message Service. SMS messaging currently allows messages of up to 160 alphanumeric and punctuation characters to be sent quickly and cheaply between mobile telephones. The messages may include images. The messages are received over the mobile network 20 using the radio communication circuit 11, and are stored in the memory 13. Using the keyboard 14 to input commands, the stored messages may be selectively displayed on the display 15.

.. As will be described in more detail below, the payment system relies on the mobile telephone 10 receiving a message including an image which includes a barcode 1 which graphically represents transaction data. The existing functionality of the mobile telephone 10 allows the user to display the message including the barcode 1 on the display 15.

The payment system further includes multiple retail terminals 30, one of which is shown in Fig. 2. The retail terminals 30 are provided in retail locations such as shops. Each retail terminal 30 has a reader 40 which is capable of reading the barcode 1, that is to read the transaction data graphically represented by the barcode 1. The retail terminal 30 and the reader 40 together constitute a retail system.

The retail terminal 30 and the reader 40 are linked together for communication by a cable 31. The reader 40 has an input/output interface 50 for communicating data to the retail terminal 30 and for accepting commands from the retail terminal 30 for control of the reader 40. The reader 40 operates under the control of a microprocessor 41 running appropriate software.

The reader 40 further includes a data reading system 42 which will now be described in more detail with reference to Figs. 3 and 4.

Fig. 3 schematically illustrates the components of the data reading system 42 which are as follows.

A window 43 is provided in the housing (not shown) of the reader 40. A charge coupled device (CCD) 44 is disposed inside the window 43 with a lens 45 arranged to focus images of objects spaced adjacent to the window 43 onto the CCD 44. The CCD 44 captures an image of the object. In use, the display 15 of the mobile telephone 10, with the barcode 1 displayed thereon, is placed adjacent the window 43 so that the CCD 44 captures an image of the barcode 1.

In addition, the data reading system 42 includes an illumination unit for illuminating an object placed adjacent the window 43 as illustrated in Fig. 4. The illumination unit comprises a plurality of light emitting diodes (LEDs) 46 which are arranged as illustrated in perspective view in Fig. 4. The LEDs 46 are arranged to provide indirect illumination. This is achieved by arranging the LEDs 46 around the periphery of the window 43. To provide shadow-less illumination, the LEDs 46 direct light towards the window 43 through a screen 47 arranged to diffuse the light emitted by the LEDs 46. The screen 47 may be formed of any suitable diffusive material, for example a frosted plastic. The illumination unit consisting of the LEDs 46 and the screen 47 is particularly advantageous for reading a barcode 1 displayed on the display 15

of the mobile telephone 10, because the image will typically be of very low contrast, particularly if the display 15 is not illuminated.

Optionally, the LEDs 46 may be switched on and off, under the control of the microprocessor 41, to indicate when the reader 40 is ready for use.

The data reading system 42 further includes a memory 48 to which the contents of the CCD 44 are periodically transferred, typically at around 25Hz. The microprocessor 41 runs conventional software to recognise when an image of the barcode 1 is stored in the memory 48 by recognising identifying characteristics of a QR Code barcode. Upon such recognition, the software uses a known decoding algorithm, as described above, to obtain the transaction data graphically represented by the barcode 1. The decoding algorithm may incorporate error correction. On successful reading of the transaction data, the software causes sounding of a beeper provided in the reader 40. If no barcode is recognized, then the next image captured by the CCD 44 is loaded into the memory 48 and the process repeats.

The reader 40 communicates the read transaction data to the retail terminal 30 using the input/output interface 50. Once the transaction data has been successfully read, the software causes the microprocessor 41 to examine successive images loaded into the memory 48 to determine when the barcode 1 has been moved away. At that point, the reader 10 repeats the process to read a further barcode 1.

The retail terminal 30 is of a conventional type for processing payment in a retail location. It includes a keyboard 32 as an input means for operating the retail terminal 30. It also includes a display 33, such as an LCD display, used to display information during the payment process, for example the payment amount and the nature of the product. The retail terminal 30 further includes a printer 34 which may be used to print receipts.

The retail terminal 30 is controlled by a control process 35 which may be implemented by software running on a microprocessor. The control process 35 causes the retail terminal 30 to operate in a manner which will be described in more detail below.

The control process 35 includes payment processes for accepting payments, for example cash payments or electronic payments, e.g. by credit card. For accepting payments by cash, the payment processing includes a step of data entry through the keyboard 32 to confirm physical receipt of the cash. For accepting payments by credit card, the retail terminal 30 may include a credit card reader (not shown) for reading the credit card details and the payment processing includes steps of communicating with the credit card provider. Such payment processes are in themselves conventional, but the control process 35 includes further steps specific to implementing the invention, as described in more detail below.

The retail terminal 30 further includes an input/output interface 36 provided for communication with the reader 40 over the cable 31. In particular, the input/output interface 36 allows the retail terminal 30 to receive transaction data from the reader 40 and to issue commands to control the reader 40.

The retail terminal 30 also includes a modem 37 allowing the retail terminal 30 to communicate over a switched telephone network 55 which may be the PSTN or any other switched network. The switched telephone network 55 is used as a communications link between the retail terminal 30 and a transaction control system 60, described in more detail below. In principle, the switched telephone network 55 could be replaced by any other communications link, but the switched telephone network 55 is preferred for ease of implementation, in particular because it is allowed using communications with a large number of existing retail locations without necessitating additional infrastructure.

The payment system further comprises a transaction control system 60 consisting of a transaction server 70, an account server 80 and a messaging server 90. Each of the servers 70, 80 and 90 are arranged in different locations. The transaction server 70 and the account server 80 communicate over a first private network 61. The transaction server, 70 and the SMS server 90 communicate over the second private network 62. The first and second private network 61 and 62 may be a network of any suitable form allowing communication between the servers 70, 80 and 90. They will typically be networks providing a high degree of security. The first and second private

networks 61 and 62 may be constituted by the same or different networks. In principle, the first and second private networks 61 and 62 could be replaced by any form of communication link allowing communication between the servers 70, 80 and 90.

Each of the servers 70, 80 and 90 is a computer system of conventional construction. The servers 70, 80 and 90 run software to implement the present invention as described in more detail below. Whilst the use of a separate transaction server 70, account server 80 and messaging server 90 is preferred, alternatively the functionality of any of the servers 70, 80 and 90 may be combined in the same server.

The servers 60, 70 and 80 store various databases consisting of database records which include a key used to locate database records within the database in a 10 conventional manner.

The transaction server 70 is arranged as follows.

The transaction server 70 has first and second interfaces 71 and 72 for communicating with the accounts server 80 and the messaging server 90, respectively, over the first and second private networks 61 and 62, respectively. In addition, the transaction server 70 includes a third interface 73 for communication with the retail terminal 30 over the switched telephone network 55. The transaction server 70 has a control process 74 which may be implemented by a processor running appropriate software. The control process 74 controls the operation of the transaction server 70 to implement the present invention as described in more detail below. Under the control of the control process 74, the transaction server 70 maintains a transaction database 75 and a key database 76.

The transaction database 75 stores records of desired transactions for respective mobile radio apparatus accounts. In particular, the transaction database records each comprise:

- data identifying a particular mobile network operator;
- the telephone number of a particular mobile telephone 10; and
- the desired payment amount.

The mobile telephone number is used as the key for the transaction database records of the transaction database 75. As described in more detail below, the

telephone number stored as part of the transaction database record is used as data to identify the account of the mobile telephone 10.

The records of the key database 76 consist of mobile telephone numbers which are used as the keys to the transaction database 75. The keys for the key database 76 are randomly generated numbers.

In use, the randomly generated keys are included in the transaction data represented by the barcodes in the mobile telephone 10. As the records of the key database 76 are mobile telephone numbers which correspond to a mobile telephone account, the keys for the key database 76 similarly correspond to a mobile telephone account. As described in more detail below, the keys for the key database 76 are used to identify a transaction database record in the transaction database 75 which in turn are used to identify a mobile telephone account. A particular transaction database record in the transaction database 75 is located using the key database 76 to link the randomly generated key in the transaction data to a particular transaction database record.

The account server 80 is the existing account of a particular network operator. The payment system may include plural account servers 80 of different network operators. The account server 80 is arranged as follows.

The account server 80 has an interface 81 for communicating with the transaction server 70 over the first private network 61.

The account server 80 has a control process 82 which may be implemented by a processor running appropriate software. The control process 82 controls the operation of the account server 80 to implement the present invention as described in more detail below.

The account server 80 stores an account database 83 consisting of account database records which are each a record of information concerning a respective mobile telephone account. The account database records include various information about the account, including an amount of credit. As the mobile telephone 10 is used, the amount of

credit in the account database record for the account in respect of that mobile telephone 10 is reduced. Typically, the account database records will include much other information as well, for example information about the user and the type of account. The mobile telephone number may be used as a key to the account database records in the account database 83.

The messaging server 90 is arranged as follows.

The messaging server 90 has an interface 91 for communicating with the transaction server 70 over the second private network 62.

The messaging server 90 further includes a SMS messaging interface 92 for sending and receiving SMS messages over the mobile network 20. In use, the SMS messaging interface 92 is used to send message to, and receive messages from, the mobile telephone 10. In particular, the SMS messaging interface 92 has one or more telephone numbers to which the mobile telephone 10 can send messages. In the event that the payment system is applied to plural mobile networks 20, there may be a separate messaging interface 92 for each mobile network 20.

The messaging server 90 has a control process 93 which may be implemented by a processor running appropriate software. The control process 93 controls the operation of the messaging server 90 to implement the present invention as described in more detail below.

The messaging server 90 further includes encoding software 94 for encoding data into a QR Code barcode 1.

Operation of the payment system will now be described. The operation is controlled by the control process 35, the control process 74, the control process 82 and the control process 93 of the retail terminal 30, the transaction server 70, the account server 80 and the messaging server 90, respectively. In this manner, the control processes 35, 74, 82 and 93 constitute means for forming various functions corresponding to the various means defined in the claims.

The first stage is a registration. This is initiated by the user sending a request message from the mobile telephone 10 to the messaging server 90 to indicate the desire to credit the account of the mobile telephone 10.

The request message may be prepared using the messaging functionality of the mobile telephone 10. The request message is sent to a telephone number of the messaging server 90. The user might be informed of the appropriate telephone number of the messaging server 90 in advance, for example as part of a mail-shot or by a directed SMS message.

The content of the SMS message may also indicate the nature of the desired product, that is indicating crediting of a mobile telephone account, and also the desired payment amount. For example, the message format might be "topup10" to indicate a top-up by £10. As an alternative, a different telephone number might indicate different desired payment amounts, in which case the message might include no content at all.

On receipt of the request message, the messaging server 90 assembles the 10 following information:

- the desired payment amount, as included in the text of the request message, or alternatively as indicated by the telephone number to which the request message is sent;
- the network operator of the mobile network 20, of the mobile telephone 10, which is known from the identity of the mobile network 20 from which the request message is received; and

- the telephone number of the mobile telephone 10 which is also known from the additional information accompanying the request message, for example the MSISDN field of the transmission record containing the request message.

In the event that the content of the request message cannot be successfully parsed, then the messaging server 90 replies to the request message with a message explaining the error and suggesting ways of avoiding similar errors in the future.

The assembled data is then transmitted from the messaging server 90 to the transaction server 70.

The transaction server 70 creates a transaction database record using the data transmitted from the messaging server 90. The transaction database record includes all the data transmitted from the messaging server. The telephone number of the mobile telephone 10 is used as a key to the created transaction database record. In addition, a key database record is created in the key database 76. The key database record comprises

the mobile telephone number of the mobile telephone 10. A number is randomly generated using a pseudo-random number generator. The randomly generated number is checked to be unique against the keys already stored as keys in the key database 76. Provided it is unique, the randomly generated number is stored as the key to the newly created key database record. If it is not unique, a new random number is generated and the checking process is repeated.

The transaction server 70 then assembles the key and a product code, which is data identifying the product, that is the network operator of the mobile network 20 and the desired payment amount. The product code is extracted from a table stored on the transaction server 70 containing product codes for all possible combinations of mobile operators and payment amounts. Later, the product code is used to identify both the mobile network operator and the payment amount at the retail terminal 30. The key to the created key database record in the key database 76 is later used as data to identify the desired transaction database record in the transaction database 75 because it used to retrieve the telephone number in the record of the key database 76 which in turn is used to access the transaction database. Furthermore, the key to the created key database record in the key database 76 corresponds to an account database record, because the transaction database record in the transaction database 75 identified thereby includes the telephone number of a particular mobile telephone 10 which may be used as a key to identify an account database record in the account database 83. The key and the product code, which are both numeric, constitute transaction data in the following process. The transaction data is transmitted back to the messaging server 90.

On receipt of the transaction data, the messaging server 90 uses the encoding software 94 to generate a barcode 1 which is a graphical representation of the transaction data. The messaging server 90 then constructs a message including the barcode 1. This message may also include further content such as information for the user or advertising material. The messaging server 90 then transmits the message to the mobile telephone 10 over the mobile network 20.

On receipt of the message, the user may view the message on the display 15 and store it in the memory 13 using the keyboard 14 to control the messaging functionality of the mobile telephone 10.

At a time of the user's choosing, the user visits a location having a retail terminal 30 equipped with a reader 40 to pay for a top-up. The keyboard 32 of the retail terminal 30 is operated by the retailer to perform the process for a barcode-activated top-up. This causes the retail terminal 30 to send a command to the reader 40 to commence reading.

The user operates the mobile telephone 10 to display the received message including the barcode 1 on the display 15, and then positions the mobile telephone 10 with the displayed barcode 1 adjacent the window 43 of the reader 40.

The reader 40 reads the transaction data represented by the barcode 1, in the manner described above, and transmits the transaction data to the retail terminal 30.

The retail terminal 30 extracts the product code from the transaction data and uses it to determine the payment amount and the mobile network operator by reference to a table stored in the retail terminal 30 identical to the table used by the transaction server 70 to generate the product code. The retail terminal 30 then displays this information on the display 33 for checking with the user.

At this point, there is an optional authorization stage. The authorization stage starts with the retail terminal 30 transmitting the key of the key data base 76, which is read as part of the transaction data, to the transaction server 70. Next, the transaction server 70 uses the received key to check the transaction database record in the transaction database 75 identified by the key, using the key database 76. The transaction server 70 determines whether a predetermined criteria is met. Various criteria are possible. Indeed the possibility to select different criteria provides the authorisation step with significant flexibility.

A simple criteria is simply to check that a corresponding transaction database record actually exists in the transaction database 75.

A more complicated criteria is to check the transaction database record correlates with the product code read by the reader 40 as part of the transaction data. This of

course requires that the retail terminal 30 additionally communicates the product code to the transaction servers 70.

Other possible criteria include checking conditions represented by data in the transaction database record. For example, the transaction database record might specify a time period outside which authorization is not given or a deadline after which authorization is not given. This allows the transaction database record to expire after a certain time. It is envisaged that any other types of condition might be implemented.

If the predetermined criteria is met, the transaction server 70 communicates an authorization to the retail terminal 30. The retail terminal 30 is inhibited from accepting the payment unless the authorization is received.

The next step is for the retail terminal 30 to accept the payment. In itself, the payment process is a conventional process for receiving a payment, for example by cash or by credit card.

The payment amount is displayed on the display 33 of the retail terminal 30. There are several options to identify the payment amount for the payment process.

A first option is that the payment amount is identified from the product code read as part of the transaction data.

A second option is for the payment amount to be retrieved from the transaction database 75 of the transaction server 70. To achieve this, the key of the key database 76 is transmitted from the retail terminal 30 to the transaction server 70 which uses the transmitted key to retrieve the payment amount from the corresponding transaction database record using the key database 76. The retrieved payment amount is then transmitted back from the transaction server 70 to the retail terminal 30.

A third option is for the payment amount to be input to the retail terminal 30 using the keyboard 32, at the time of making the payment. This option may be used instead of the first or second options, or may be used to change the payment amount identified by using the first or second option.

A modification of the third option is for the transaction data to identify one of a plurality of menus stored on the retail terminal 30. The menus each include a 30 different set of possible payment amounts. The menu identified by the transaction data

is displayed on the display 33 and one of the displayed amounts is selected by operation of the keyboard 32 to input the payment amount. Such menus may be periodically downloaded from the transaction server 70 to the retail terminal 30.

Once the payment process is completed, the retail terminal 30 sends data to the transaction server 70 confirming that the payment has been accepted, as well as the transaction data read by the reader, including both the product code and the key of the key database 76.

On receipt of this data, the transaction server 70 updates the transaction database record in the transaction server, 70 identified by the key to indicate that payment has been accepted. The transaction server 70 also accesses the transaction database record in the transaction database 75 using the key and assembles the following data:

- the network operator;
- the telephone number of the mobile telephone 10; and
- any other additional information required by the account server 80, this depending on the interface specifications of the account server 80.

The assembled data is transmitted from the transaction server 70 to the account server 80.

On receipt of this data, the account server 80 updates the account database record in the account database 83 identified by the mobile telephone number received from the transaction server 70. In particular, the account server 80 credits the account by the payment amount identified in the data from the transaction server 70. On successful updating of the account database 83, the account server 80 transmits a confirmation record back to the transaction server 70 to confirm updating of the account database 83, and additional information such as the new balance of the mobile telephone account. Alternatively, if the update of the account database 83 is unsuccessful, then the account server 80 transmits a failure record to the transaction server 70 indicating the failure.

On receipt of a confirmation record from the account server 80, the transaction server 70 creates two records, firstly a confirmation record for the messaging server 90 containing the mobile telephone number and the new balance, and secondly a confirmation record for the retail terminal 30 with the new balance. These records are then sent to the messaging server 90 and the retail terminal 30, respectively.

On receipt of a confirmation record, the retail terminal 30 displays information on the display 33 to indicate the new balance and causes the printer 34 to print receipts, for example a copy for the user and a copy for the retailer.

On receipt of the record confirmation, the messaging server 90 constructs a message containing the new balance, and sends this message to the mobile telephone 10 over the mobile network 20. This message therefore confirms to the user that the account has been properly credited.

In the event of the transaction server 70 receiving a message from the account server 80 to indicate that the updating of the account database was unsuccessful, then the transaction server 70 creates two failure records, to indicate this failure, firstly for the messaging server 90 and secondly for the retail terminal 30. The failure records are then sent to the messaging server 90 and the retail terminal 30, respectively.

On receipt of a failure record, the retail terminal 30 undergoes a process to cancel the payment process and refund the payment.

The messaging server 90, on receipt of a failure record indicating a failed top-up the messaging server 90 constructs an appropriate message and sends this to the mobile telephone 10 over the mobile network 20.

It will be appreciated that the payment system described above is merely one way of implementing the invention and numerous modifications to the hardware and software are possible.

Claims

1. A method of crediting a mobile radio apparatus account using:
 - a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of data;
 - a retail system having a reader capable of reading graphically represented data displayed on said display of said mobile radio apparatus; and
 - a transaction control system remote from the retail system, the retail system and the transaction control system being capable of communicating over a communications link, the transaction control system storing account database records of mobile radio apparatus accounts, each account database record including an amount of credit; andthe method comprising:
 - displaying on the display of the mobile radio apparatus an image including a 15 graphical representation of transaction data which includes data corresponding to an account database record;
 - using the reader of the retail system to read the graphically represented transaction data displayed on the display of the mobile radio apparatus;
 - using the retail system to accept a payment;
 - communicating from the retail system to the transaction control system, the read data corresponding to an account database record and data indicating that payment has been accepted;
 - updating the account database record corresponding to the communicated data to credit the mobile radio apparatus account by the payment amount.
2. A method according to claim 1, wherein the transaction control system further stores transaction database records of desired transactions for respective mobile radio apparatus accounts, and said data corresponding to an account database record included in said transaction data is data which identifies a transaction database record.
3. A method according to claim 2, wherein

the account database records and the transaction database records are stored in an account database and a transaction database, respectively, which databases are separate from each other, each transaction database record including data identifying an account database record in the account database,

said step of updating the account database record comprises:

extracting, from the transaction database record identified by the communicated data, the data identifying an account database record in the account database; and

updating the account database record in the account database identified by the data extracted from the transaction database to credit the mobile radio apparatus account by the payment amount.

4. A payment system for crediting a mobile radio apparatus account comprising:
 - a transaction control system storing account database records of mobile radio apparatus accounts, each account database record including an amount of credit; and
 - a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of transaction data which includes data corresponding to an account database record;
 - a retail system remote from the transaction control system; and
 - a communications link between the retail system and the transaction control system,
- the retail system comprising:
 - a reader capable of reading graphically represented transaction data displayed on said display of said mobile radio apparatus;
 - payment means for accepting a payment; and
 - means for communicating the read data corresponding to an account database record and data indicating that payment has been accepted over the communications link to the transaction control system;

the transaction control system comprising account update means for updating the account database record corresponding to the communicated data to credit the mobile radio apparatus account by the payment amount.

5. A payment system according to claim 4, wherein the transaction control system further stores transaction database records of desired transactions for respective mobile radio apparatus accounts, and said data corresponding to an account database record included in said transaction data is data which identifies a transaction database record.
6. A payment system according to claim 5, wherein the transaction control system further comprises transaction update means, responsive to the data communicated from the retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted.
7. A payment system according to claim 5 or 6, wherein the transaction control system stores the account database records and the transaction database records in an account database and a transaction database, respectively, which databases are separate from each other, each transaction database record including data identifying an account database record in the account database, the transaction control system further comprises extraction means for extracting, from the transaction database record identified by the communicated data, the data identifying an account database record in the account database, and said account update means is arranged to update, in the account database, the account database record identified by the data extracted from the transaction database.
8. A payment system according to claim 7, wherein the transaction control system includes:
an account server including said account database and said account update means;

transaction server including said transaction database and said extraction means; and

a communications link between said transaction server and said account server.

9. A payment system according to any one of claims 5 to 8, wherein the transaction control system includes authorization means, responsive to the data identifying a transaction database record communicated from the retail system, for checking the transaction database record identified by the communicated data and communicating an authorization to the retail system if a predetermined criterion is met, and the payment means is arranged to inhibit acceptance of the payment until receipt of said authorisation by said retail system.
10. A payment system according to any one of claims 5 to 9, wherein each transaction database record includes the payment amount, the transaction control system includes retrieval means, responsive to the data identifying a transaction database record communicated from the retail system, for retrieving the payment amount from the transaction database record identified by the communicated data and communicating the retrieved payment amount to the retail system, and the payment means is arranged to accept the payment of the payment amount communicated from the transaction control system.
11. A payment system according to any one of claims 4 to 10, wherein said transaction data further includes the payment amount and the payment means is arranged to accept the payment of the payment amount read as part of the transaction data.
12. A payment system according to any one of claims 4 to 11, wherein the image is a message received by the mobile radio apparatus, and

the transaction control system includes messaging means including transmission means for transmitting a message comprising an image including a graphical representation of transaction data which includes data corresponding to an account database record.

13. A payment system according to claim 12 when appendant from claim 5, wherein

the messaging means further includes reception means for receiving a request message from the mobile radio apparatus indicative of the desire to credit the mobile radio apparatus account of the mobile radio apparatus,

the transaction control system further includes transaction database record creation means, responsive to the receipt of a message by said reception means, for creating a transaction database record including the data identifying the account of the mobile radio apparatus from which a message is received, and

said transmission means is responsive to the creation of a transaction database record by said transaction database record creation means for transmitting a message comprising an image including a graphical representation of transaction data which includes data identifying the created transaction database record.

14. A payment system according to claim 12 or 13, wherein the transaction control system includes:

a transaction server including said transaction database and said transaction update means;

a messaging server constituting said messaging means; and

a communications link between said transaction server and said messaging server.

15. A payment system according to any one of claims 4 to 14, wherein said data corresponding to an account database record, included in said transaction data, consists of a randomly generated number.

16. A payment system according to any one of claims 4 to 15, wherein the mobile radio apparatus is a mobile telephone.
17. A payment system according to any one of claims 4 to 16, wherein the graphical representation is a two-dimensional barcode.
18. A payment system according to any one of claims 4 to 17, wherein the two-dimensional barcode is a matrix barcode.
19. A retail system for use in a payment system according to any one of claims 4 to 18, comprising:
 - a reader capable of reading graphically represented transaction data including data corresponding to an account database record displayed on a display of a mobile radio apparatus;
 - payment means for accepting a payment; and
 - means for communicating the read data and data indicating that payment has been accepted over a communications link to a transaction control system.
20. A retail system according to claim 19, wherein the payment means is arranged to accept the payment of a payment amount read as part of the transaction data.
21. A retail system according to claim 19 or 20, wherein the payment means is arranged to inhibit acceptance of the payment until receipt of an authorization by said retail system.
22. A retail system according to any one of claims 19 to 21, wherein said payment means and said means for communicating are arranged in a single terminal.
23. A transaction control system for use in a payment system according to any one of claims 4 to 18,

the transaction control system storing account database records of mobile radio apparatus accounts, each account database record including an amount of credit, and the transaction control system comprising account update means for updating the account database record corresponding to the transaction database record identified by the communicated data to credit the mobile radio apparatus account by the payment amount.

24. A transaction control system according to claim 23, wherein the transaction control system further stores transaction database records of desired transactions for respective mobile radio apparatus accounts, and said data corresponding to an account database record included in said transaction data is data which identifies a transaction database record.

25. A transaction control system according to claim 24, wherein the transaction control system further comprises transaction update means, responsive to the data communicated from the retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted.

26. A transaction control system according to claim 24 or 25, wherein the transaction control system stores the account database records and the transaction database records in an account database and a transaction database, respectively, which databases are separate from each other, each transaction database record including data identifying an account database record in the account database, the transaction control system further comprises:
extraction means for extracting, from the transaction database record identified by the communicated data, the data identifying an account data base record in the account database, and
said account update means is arranged to update, in the account database, the account database record identified by the data extracted from the transaction database.

27. A transaction control system according to any one of claims 24 to 26, wherein
- each transaction database record includes the payment amount, and
- the transaction control system includes retrieval means, responsive to the data identifying a transaction database record communicated from the retail system, for retrieving the payment amount from the transaction database record identified by the communicated data and communicating the retrieved payment amount to the retail system.
28. A transaction control system according to any one of claims 24 to 27, wherein the transaction control system includes authorization means, responsive to the data identifying a transaction database record communicated from the retail system, for checking the transaction database record identified by the communicated data and communicating an authorization to the retail system if a predetermined criterion is met.
29. A transaction control system according to any one of claims 23 to 28, wherein the transaction control system includes messaging means including transmission means for transmitting a message comprising an image including a graphical representation of transaction data which includes data identifying a transaction database record.
30. A transaction control system according to claim 29 when appendant from claim 24, wherein
- the messaging means further includes reception means for receiving a request message from the mobile radio apparatus indicative of the desire to credit the mobile radio apparatus account of the mobile radio apparatus,
- the transaction control system further includes transaction database record creation means; responsive to the receipt of a message by said reception means, for creating a transaction database record including data identifying the account of the mobile radio apparatus from which a message is received, and

said transmission means is responsive to the creation of a transaction database record by said transaction database record creation means for transmitting a message comprising an image including a graphical representation of transaction data which includes data identifying the created transaction database record.

31. A transaction control system according to claim 29 or 30, wherein the transaction control system includes:

a transaction server including said transaction database and said transaction update means;

a messaging server constituting said messaging means; and

a communications link between said transaction server and said messaging server.

32. A transaction server for use in a payment system according to claim 8 or any one of claims 9 to 18 when appendant from claim 8,

the transaction server storing a transaction database of transaction database records of desired transactions, each transaction database record including data identifying an account database record of a mobile radio apparatus account in an account database stored on an account server,

the transaction server comprising:

transaction update means, responsive to data identifying a transaction database record communicated from a retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted;

means for extracting from the transaction database record identified by the communicated transaction data, the data identifying an account database record in the account database; and

means for communicating the extracted data and the payment amount to the account server.

33. A transaction server according to claim 32, wherein

each transaction database record includes the payment amount, and the transaction server includes retrieval means, responsive to the data identifying a transaction database record communicated from the retail system, for retrieving the payment amount from the transaction database record identified by the communicated data and communicating the retrieved payment amount to the retail system.

34. A transaction server according to claim 32 or 33, wherein the transaction server includes authorization means, responsive to the data identifying a transaction database record communicated from the retail system, for checking the transaction database record identified by the communicated data and communicating an authorisation to the retail system if a predetermined criterion is met.
35. A method of payment for a product using:
- a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of data;
 - a retail system having a reader capable of reading graphically represented data displayed on said display of said mobile radio apparatus; and
 - a transaction control system remote from the retail system, the retail system and the transaction control system being capable of communicating over a communications link, the transaction control system storing transaction database records of desired transactions each including data identifying a desired product,
- the method comprising:
- displaying on the display of the mobile radio apparatus an image including a graphical representation of transaction data which includes data identifying a transaction database record;
 - using the reader of the retail system to read the graphically represented transaction data displayed on the display of the mobile radio apparatus;
 - using the retail system to accept a payment;

communicating from the retail system to the transaction control system, the read data identifying a transaction database record and data indicating that payment has been accepted;

updating the transaction database record identified by the communicated data to indicate that payment has been accepted; and

delivering the product identified in the identified transaction database record.

36. A payment system comprising:

a transaction control system storing transaction database records of desired transactions each including data identifying a desired product;

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of transaction data which includes data identifying a transaction database record;

a retail system remote from the transaction control system; and

a communications link between the retail system and the transaction control system,

the retail system comprising:

a reader capable of reading graphically represented transaction data displayed on said display of said mobile radio apparatus;

payment means for accepting a payment; and

means for communicating the read data identifying a transaction database record and data indicating that payment has been accepted over the communications link to the transaction control system;

the transaction control system comprising:

means, responsive to the data communicated from the retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted.

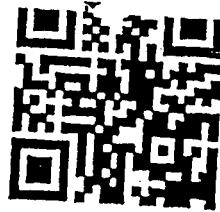
37. A payment system for crediting a mobile radio apparatus account constructed and arranged to operate substantially as hereinbefore described with reference to the accompanying drawings.

38. A method of crediting a mobile radio apparatus account substantially as hereinbefore described with reference to the accompanying drawings.

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H04M17/00		International Application No .../IB 03/05665
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 H04L G07F G06F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, INSPEC, WPI Data, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 16, 8 May 2001 (2001-05-08) & JP 2001 005883 A (NTT DATA CORP), 12 January 2001 (2001-01-12) the whole document	1-36
P, A	US 2003/086545 A1 (RAUBA RIMAS ET AL) 8 May 2003 (2003-05-08) paragraph '0016! - paragraph '0019! paragraph '0022! paragraph '0033!	1-36
A	DE 100 29 333 A (BERGMANN TJARK) 3 January 2002 (2002-01-03) paragraph '0024! - paragraph '0027! -/-	1-36
<div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex. </div>		
* Special categories of cited documents:		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>*Z* document member of the same patent family</p> </div> </div>		
Date of the actual completion of the international search <div style="text-align: center; font-size: 1.2em;">8 September 2004</div>		Date of mailing of the international search report <div style="text-align: center; font-size: 1.2em;">15/09/2004</div>
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer <div style="text-align: center; font-size: 1.2em;">Patlaka, E.</div>

Fig. 1



1

Fig. 2

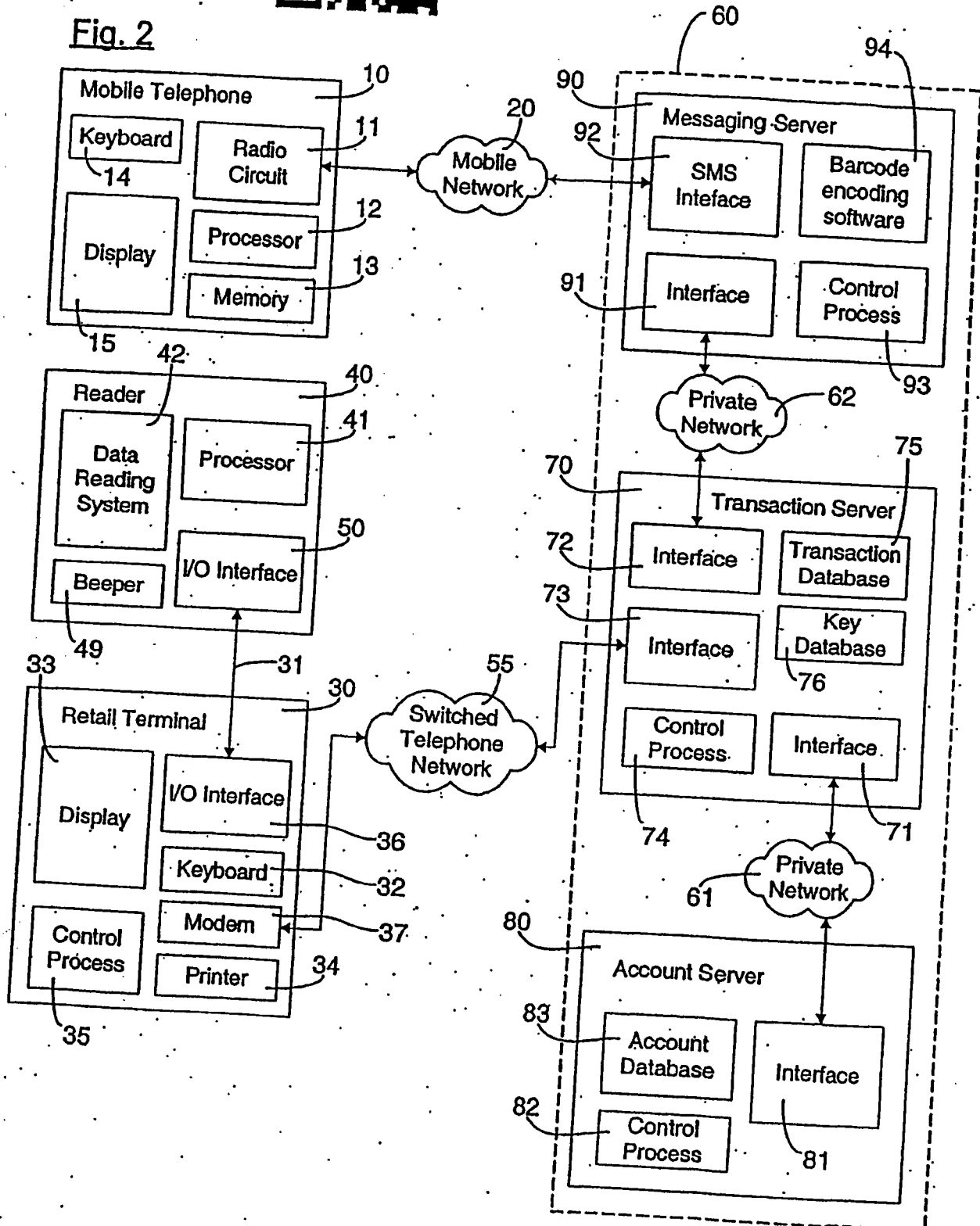
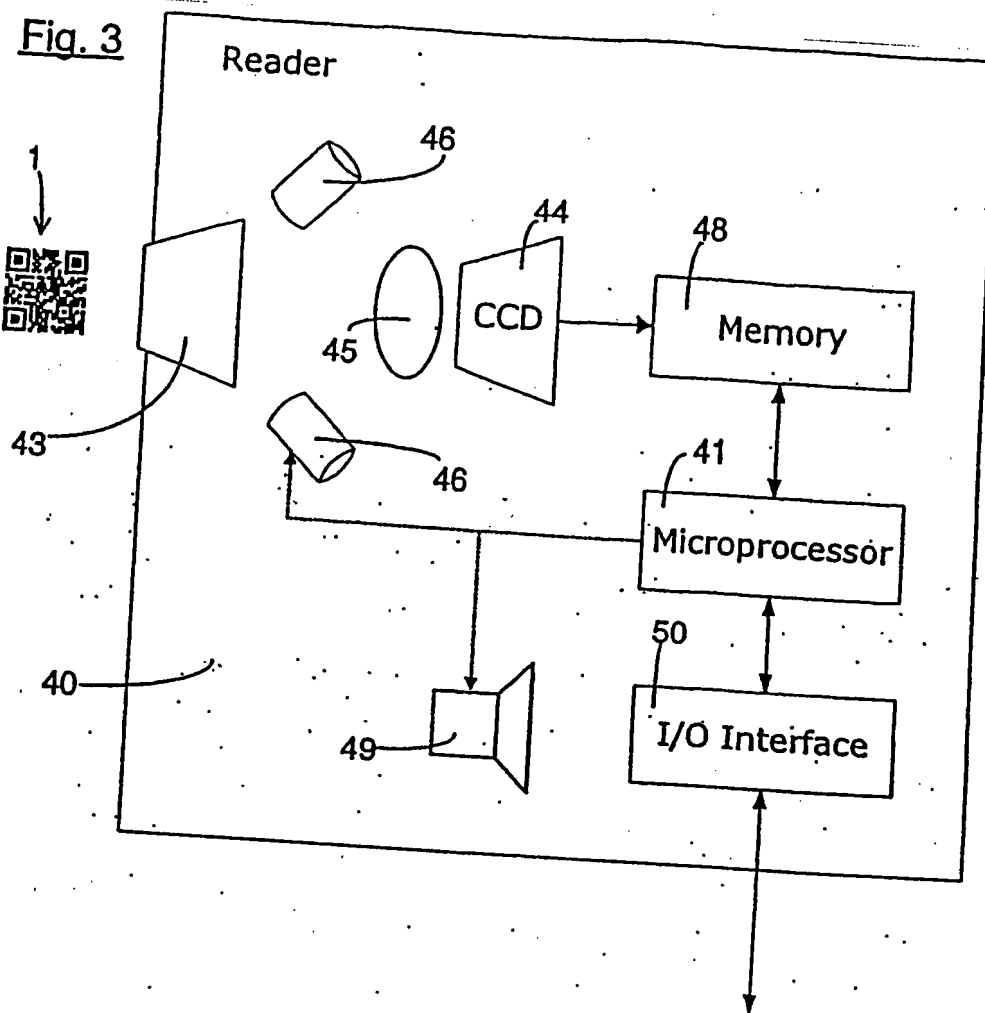
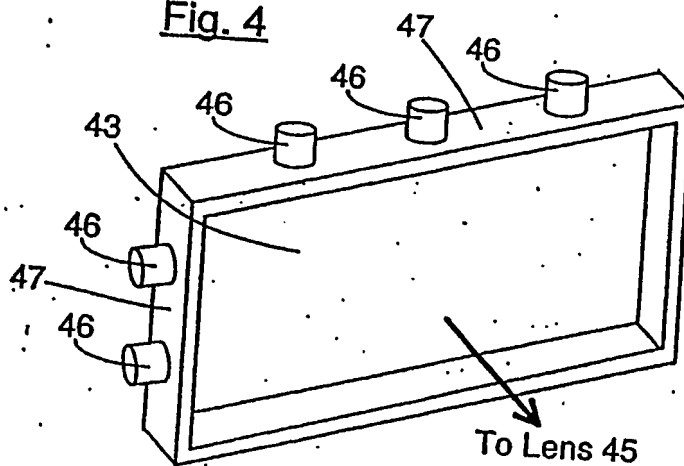


Fig. 3**Fig. 4**

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 03/05665

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 2001005883	A	12-01-2001	JP 3494613 B2	09-02-2004
			JP 2002157540 A	31-05-2002
US 2003086545	A1	08-05-2003	WO 03047233 A1	05-06-2003
DE 10029333	A	03-01-2002	DE 10029333 A1	03-01-2002
WO 02093515	A	21-11-2002	WO 02093515 A2	21-11-2002

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C. (Continuation of documents considered to be relevant)

International Application No

IB 03/05665

Category *

Citation of document, with indication, where appropriate, of the relevant passages

Relevant to claim No.

A

WO 02/093515 A (TEICHER-MORDECHAI ; CARDIS
INTERNAT INTERTRUST N V (NL))
21 November 2002 (2002-11-21)
claims 1-8

1-36



Delivery Notification

Dear Customer, *Brian Tagg*

This is in response to your request for delivery information concerning the shipment listed below.

Tracking Number: 1Z A51 07E 66 9831 773 6
Service: EXPRESS
Shipped/Billed On: 06/22/2007
Delivered On: 06/25/2007 10:48 A.M.
Delivered To: FAREHAM, GB
Signed By: OSBOUR
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Thank you for giving us this opportunity to serve you.

Sincerely,
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Tracking results provided by UPS: 07/27/2007 8:58 A.M. ET

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1 OF 1

1 OF 1

SHIP#:-A510-7EVL-H48
DATE: 22 JUN 2007

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401-392-7373
GTECH CORPORATION RI140
10 MEMORIAL BOULEVARD
PROVIDENCE RI 02903
UNITED STATES

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441 489-556700

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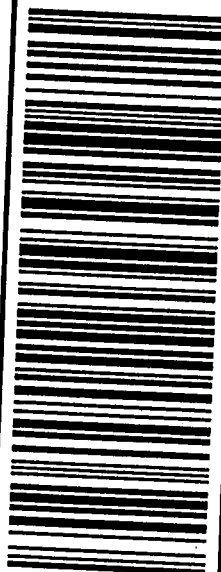
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West Greenwich, RI 02817 USA

Legal Department Fax Number: (401) 392-0391

DATE: June 22, 2007

TO: Brian Tagg, COO

TO:

COMPANY: InComm Europe Ltd.

FAX NUMBER: 011 44 1489588498

DIRECT PHONE: 011 44 1489556700

COMPANY:

FAX NUMBER:

DIRECT PHONE:

FROM: Marie LoPresti

PHONE:

RE: U.S. Patent Application No. 10/539,461
Title: Payment System

NUMBER OF PAGES (INCLUDING THIS PAGE): 59

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COMPANY:	InComm Europe Ltd.	COMPANY:
FAX NUMBER:	011 44 1489588498	FAX NUMBER:
DIRECT PHONE:	011 44 1489556700	DIRECT PHONE:
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RE: U.S. Patent Application No. 10/539,461
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Providence, Rhode Island
02903
Telephone 401 392-1000
Fax 401 392-0391

June 22, 2007

VIA UPS

John Guest
Vice President Europe
InComm Europe Ltd
1638 Parkway
Solent Business Park
Whiteley, Hants PO15 7AH

Re: US Patent Application No. 10/539,461 claiming priority to GB0229765.3
Title: Payment System

Dear Mr. Guest:

Attached is a copy of an Assignment Agreement entered into by you, Brian Tagg, Radicall Projects Limited and Inca Payments Limited in connection with the above-referenced patent application. A copy of the corresponding PCT application is also attached for your convenience.

The United States Patent and Trademark Office is requiring that a signed Declaration of Inventors be filed by June 27, 2007 in connection with this matter. I have attached a copy of the Declaration and ask that you confirm your inventor information, sign and date the document where indicated, and immediately fax to my attention at 401.392.0391. Should any of the inventor information be incorrect, please make the appropriate changes and initial each change. Please also return the originally executed Declaration to my attention as soon as possible. A return UPS package is enclosed herewith for your convenience.

I appreciate your immediate attention to this matter. Please feel free to contact me at 401.392.7373 if you have any questions.

Kind regards,

Marie LoPresti
IP Paralegal
GTECH Corporation

Enclosures

**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

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Submitted
With Initial
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OR

☒ Declaration
Submitted after Initial
Filing (surcharge
(37 CFR 1.16 (e))
required)

Attorney Docket
Number

033327.0024

First Named Inventor

Guest, et al.

COMPLETE IF KNOWN

Application Number

10/539,461

Filing Date

12/22/2003

Art Unit

Examiner Name

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Payment System

the specification of which

(Title of the Invention)

☐ Is attached hereto

OR

☒ was filed on (MM/DD/YYYY)

12/22/2003

as United States Application Number or PCT International

Application Number

PCT/IB03/05665

and was amended on (MM/DD/YYYY)

06/20/2005

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

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Prior Foreign Application ()	Country	Foreign Filing Date (/DD/)	Priority Claimed	Certified Copy Attached?	
				ES	NO
PCT/IB03/05665 0229765.3	PCT	12/22/2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	UK	12/20/2002	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]
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☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])

John

Family Name or Surname

Guest

Inventor's Signature

Date

Residence: City

State

Country

Citizenship

Fareham

Hants

UK

UK

Mailing Address

Tregarth, 5 Old Street, Hill Head

City

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ADDITIONAL INVENTOR(S)

Page 3 of 3

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Brian		Tagg	
Inventor's Signature		Date	
Taunton		Somerset	UK
Residence: City		State	Country
The Old Bakery, Cheddon Fitzpaine		UK	
		Citizenship	
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Taunton		Somerset	TA2 8LN
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Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
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Inventor's Signature		Date	
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		Country	
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City		State	Country
		Citizenship	
Mailing Address			
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		Country	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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**C L I F F O R D
C H A N C E**

LIMITED LIABILITY PARTNERSHIP

RADICAEL PROJECTS LIMITED

AND

JOHN GUEST

AND

BRIAN TAGG

AND

INCA PAYMENTS LIMITED

IP ASSIGNMENT AGREEMENT

THIS AGREEMENT is made on 24 June 2003.

BETWEEN:

- (1) RADICALL PROJECTS LIMITED, a company incorporated in England (registered no. 4479900), whose registered office is at Stansted House, Hampshire PO9 6DX, United Kingdom (the "Assignor");
- (2) JOHN GUEST of Tregarth, 5 Old Street, Hill Head, Fareham, Hants PO14 3HU;
- (3) BRIAN TAGG of The Old Bakery, Cheddon Fitzpaine, Taunton, Somerset TA2 8LN (together with John Guest, the "Inventors" and each an "Inventor"); and
- (4) INCA PAYMENTS LIMITED, a company incorporated in England (registered no. 4724859), whose registered office is at Link House, 19 Colonial Way, Watford, Hertfordshire WD24 4JL United Kingdom (the "Assignee").

THE PARTIES AGREE as follows:

RECITALS:

- (A) The Inventors claim to have transferred their interest in the Payment System Patent Application to the Assignor.
- (B) In the event that the Inventors have retained any right, title or interest in the Payment System Patent Application, the Inventors now wish to transfer any such right, title and interest to the Assignee.
- (C) In the event that the Assignor or an Inventor owns any patent or design rights relating to the Inca Services (whether registered or unregistered) (including, without limitation, the Payment System Patent Application) which it has not already assigned to the Assignee it now also wishes to assign those rights to the Assignee.
- (D) The Assignor and the Inventors may own certain copyright which the Assignee requires in order to provide the Inca Services, and to the extent that they have not already assigned the same to the Assignee, they now wish to do so.

1. DEFINITIONS

- 1.1 In this Agreement (including in the recitals to this Agreement):

"Act" means the Copyright, Designs and Patents Act 1988 as modified or re-enacted or both from time to time whether before or after the date of this Agreement;

"Applications" means any applications by the Assignor or an Inventor (whether legally or beneficially and whether solely or jointly with another party or person and wherever subsisting in the world) to register any patents relating to, used or exploited or capable of being used or exploited in connection with the Inca Services including the Payment System Patent Application and any right to make such application;

"Designs" means the registered designs and unregistered design rights and any applications for designs relating to, used or exploited, or capable of being used or

exploited in connection with the Inca Services and any right to make such an application (if any) which the Assignor or an Inventor may at the date of this Agreement own (whether legally or beneficially and whether solely or jointly with another party or person and wherever subsisting in the world);

"Inca Services" means the services related to or connected with the use of two-dimensional barcode, magnetic stripe and "e-voucher" technologies together with other technologies to facilitate the use of retail electronic networks for the purpose of permitting the prepayment of mobile telephone services;

"Patents" means together the Applications and the Registered Patents and any registered patents or patent applications deriving priority therefrom relating to, used or exploited, or capable of being used or exploited in connection with the Inca Services;

"Payment System Patent Application" means the UK patent application specified in the Schedule to this Agreement;

"Registered Patents" means any United Kingdom registered patents (if any) owned by the Assignor or an Inventor (whether legally or beneficially and whether solely or jointly with another person or parties) relating to, used or exploited or capable of being used or exploited in connection with the Inca Services;

"Works" means all code, source code and other software (including, without limitation, all modules, routines and sub-routines and all source and other preparatory materials relating to them, including functional specifications and programming specifications, programming languages, algorithms, flow charts, logic, logic diagrams, orthographic representations, file structures, coding sheets and coding), any user manuals, design documentation, process documentation, test plans and all other documentation relating to the Inca Services.

1.2 References in this Agreement to the masculine gender shall include the feminine and neuter genders.

2. ASSIGNMENT

In consideration of the sum of £1 now paid by the Assignee to the Assignor and each Inventor (the receipt of which the Assignor and the Inventors each hereby acknowledge), each of the Assignor and each Inventor hereby assigns to the Assignee absolutely, as legal and beneficial owner and with full title guarantee, all of its rights, title and interest (if any) in and to:

2.1 all copyright and other rights of a similar nature in the Works (wherever subsisting in the world) including, without limitation:

2.1.1 the exclusive right to do and to authorise others to do the acts restricted by Part 1 of the Act in relation to the Works in the United Kingdom;

2.1.2 all rights of a similar nature to those described in clause 2.1.1 conferred in respect of the Works by the laws in force in all other countries; and

- 2.1.3 the right to sue for and to recover damages and other remedies in respect of any infringement of the copyright in the Works which may have occurred before the date of this Agreement; and
 - 2.2 the Patents, including, without limitation:
 - 2.2.1 its right, title and interest (if any) in and to the Applications with the intent that the grant of any patents pursuant to the Applications will be in the name of and will vest in the Assignee;
 - 2.2.2 any rights the Assignor or an Inventor may have to make any further Application (if any) with the intent that the Application may be made in the Assignee's name and the grant of any patents pursuant to the Applications will be in the name of and will vest in the Assignee;
 - 2.2.3 all the rights, powers, liberties and immunities conferred on the applicant for or registered proprietor of the Patents, free from all liens, charges and encumbrances;
 - 2.2.4 the right to sue for and to recover damages and other remedies in respect of any infringement of the Patents or other acts carried out by another person within the scope of the claims of any published specification of any of the Patents which may have occurred before the date of this Assignment; and
 - 2.2.5 all of its rights to apply for, prosecute and obtain patents or similar rights or protection in respect of any of the inventions forming the subject-matter of the Patents in any country of the world (including the right to claim priority from the Patents); and
 - 2.3 all of its rights, title and interest (if any) to the Designs at the date of this Agreement including:
 - 2.3.1 the right to do and to authorise others to do the acts restricted by Part III of the Act in relation to the Designs in the United Kingdom; and
 - 2.3.2 the right to sue for and to recover damages and other remedies in respect of any infringement of the Designs which may have occurred before the date of this Assignment.
- 3. **FURTHER ASSURANCE**
 - 3.1 The Assignor and the Inventors shall on request by the Assignee in writing and at the Assignee's expense do and execute or arrange for the doing and executing of, each necessary act, document and thing to implement the assignments provided for in this Agreement.
 - 3.2 The Assignor and the Inventors shall, at the Assignee's expense, give all such assistance as the Assignee may reasonably request to complete the registration of:
 - 3.2.1 any Application existing at the date of this Agreement;

3.2.2 any future patent application deriving its priority date from a Registered Patent or an Application;

3.2.3 any future application for the registration of any Designs.

4. **GOVERNING LAW**

This Agreement is governed by English law.

SCHEDULE

Country

Application Number

Application Date

United Kingdom

GB0229765.3

20 December 2002

EXECUTED by the parties

Signed by
a duly authorised
representative of
RADICALL PROJECTS LIMITED:

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)
)
)


NICHOLAS NEARING SMITH
DIRECTOR


Signature

Signed by
a duly authorised
representative of
INCA PAYMENTS LIMITED:


)
)
)
)

LESLIE G. LOWIN
DIRECTOR


Signature

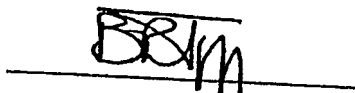
Signed by
JOHN GUEST

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Signature

Signed by
BRIAN TAGG

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Signature

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(71) Applicant (for all designated States except US): INCA
PAYMENTS LIMITED [GB/GB]; Link House, 19 Colo-
nial Way, Watford, Hertfordshire WD24 4JL (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): GUEST, John
[GB/GB]; Tregarth, 5 Old Street, Hill Head, Fareham,
Hants PO14 3HU (GB). TAGG, Brian [GB/GB]; The Old
Bakery, Cheddon Fitzpaine, Taunton, Somerset TA2 8LN
(GB).

(74) Agent: HOWE, Steven; Lloyd Wise, Commonwealth
House, 1-19 New Oxford Street, London WC1A 1LW
(GB).

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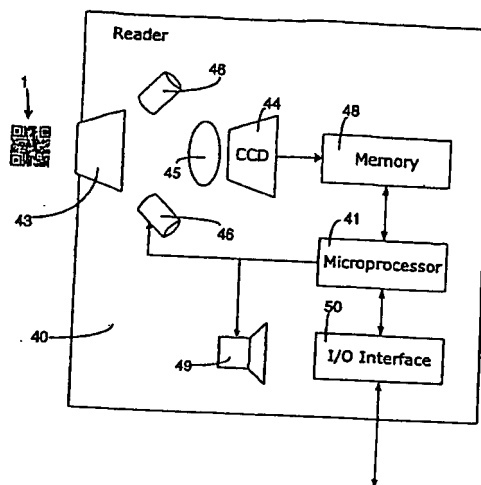
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Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted
a patent (Rule 4.17(ii)) for the following designations AE,
AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
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[Continued on next page]

(54) Title: PAYMENT SYSTEM



(57) Abstract: The credit a mobile radio apparatus account, the display (15) of the a mobile telephone (10) is used to display an image including a barcode (1) which graphically represents transaction data. This includes data identifying a transaction database records in a transaction database (75), the transaction database records including data identifying the mobile radio apparatus account. An account database (83) comprises account database records of mobile radio apparatus accounts including an amount of credit. A retail terminal (30) provided in a retail location has a reader (40) which reads the barcode (1). The retail terminal (30) accepts payment and communicates the read transaction data and data indicating that payment has been accepted to a transaction control system remote from the retail terminal (30). The transaction database (75) is updated to indicate that payment has been accepted and the account database (83) is updated to credit the mobile radio apparatus account by the payment amount.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Payment System

The present invention relates to a payment system and method allowing consumers to make payments at retail locations. It relates in particular to the use of technical means to facilitate the transaction, Whilst the invention relates specifically to payments for crediting an account for a mobile radio apparatus, such as a mobile telephone, it is also more generally applicable to payment for other products.

Mobile telephones are now a very common consumer product. In many countries, a popular type of payment arrangement for a mobile telephone is for the user to make payments to credit their account in advance of using the mobile telephone. This type of payment arrangement is commonly known as "pre-pay". The process of making a payment and crediting the user's account is commonly known as a "top-up", which term reflects the normal manner of usage in which the user frequently tops up their account by relatively small amounts.

Pre-pay is very popular. For example, in the United Kingdom, since the introduction of pre-pay mobile services in 1995, the market has grown rapidly to over 30 million users, each on average topping up their phone around eight times a year.

Pre-pay systems allow the user to make payments at a variety of retail outlets, thereby allowing the user to pay for a top-up at a location which is convenient to them.

The original top-up system involves the purchase of a voucher which is subsequently used to credit a mobile telephone account. The voucher system involves the purchase of a voucher bearing a PIN (of up to 16 digits) at a retail outlet. It requires a telephone call to an interactive voice response (IVR) system and entry of the PIN on the mobile telephone to validate the voucher prior to crediting the account of the mobile telephone.

As the market expanded, the logistical complexity of maintaining the voucher system has led mobile network operators to seek more effective alternatives. The large number of vouchers and associated transactions has led to increased costs in managing the system, in particular to reduce the opportunities for fraud and system abuse.

More recently, electronic payment systems of crediting a mobile phone account have been developed. The first electronic payment system in the United Kingdom was introduced in 1999. This system used magnetic stripe cards in which limited user details were contained within a magnetic stripe. Such a magnetic stripe card payment system involves the distribution of cards bearing a PAN (of up to 19 digits), and requires a call to an IVR system and entry of the PAN on the mobile telephone for validation of the card. Thereafter, the magnetic stripe is read when payment is made by swiping the card through a reader in a retail outlet to identify the mobile telephone account.

Despite intense efforts by the mobile network operators to promote such an electronic payment system, there has not been a great take-up by consumers. Currently in the United Kingdom, the voucher payment system dominates, accounting for approximately 70% of all pre-pay top-up sales, which amounts to an estimated 170 million sales per year. Consumer research suggests that the failure of payment systems including magnetic stripe cards to provide an acceptable alternative to paper vouchers is due to an inherent resistance by users to initially pre-register their personal details, combined with the inconvenience of carrying a separate magnetic stripe card leading to failure to do so.

The present invention has been developed as an alternative payment system and method and involves the use of different technical means from those described above to effect payment for crediting a mobile radio apparatus account.

According to a first aspect of the present invention, there is provided a method of crediting a mobile radio apparatus account using:

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of data;

a retail system having a reader capable of reading graphically represented data displayed on said display of said mobile radio apparatus; and

a transaction control system remote from the retail system, the retail system and the transaction control system being capable of communicating over a communications link, the transaction control system storing account database

records of mobile radio apparatus accounts, each account database record including an amount of credit; and

the method comprising:

displaying on the display of the mobile radio apparatus an image including a graphical representation of transaction data which includes data corresponding to an account database record;

using the reader of the retail system to read the graphically represented transaction data displayed on the display of the mobile radio apparatus;

using the retail system to accept a payment;

communicating from the retail system to the transaction control system, the read data corresponding to an account database record and data indicating that payment has been accepted;

updating the account database record corresponding to the communicated data to credit the mobile radio apparatus account by the payment amount.

According to a second aspect of the present invention, there is provided a payment system for crediting a mobile radio apparatus account comprising:

a transaction control system storing account database records of mobile radio apparatus accounts, each account database record including an amount of credit; and

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of transaction data which includes data corresponding to an account database record;

a retail system remote from the transaction control system; and

a communications link between the retail system and the transaction control system,

the retail system comprising:

a reader capable of reading graphically represented transaction data displayed on said display of said mobile radio apparatus;

payment means for accepting a payment; and

means for communicating the read data corresponding to an account

—database record and data indicating that payment has been accepted over the communications link to the transaction control system;

the transaction control system comprising account update means for updating the account database record corresponding to the communicated data to credit the mobile radio apparatus account by the payment amount.

To identify a desired transaction, the present invention uses the mobile radio apparatus to display an image including a graphical representation of transaction data. The transaction data corresponds to an account database record which is a record of the desired transaction stored remotely from the retail system. The image is displayed by the user to the reader of a retail system to read the graphically represented data and payment is accepted using the retail system. The data corresponding to an account database record, read as part of the transaction data, and also data indicating that payment has been accepted, is communicated from the retail system to the transaction control system. This communicated data is then used to update the account database record to credit the account by the payment amount. Thus, the image displayed on the mobile radio apparatus is used to identify the account which is to be credited. This provides for safe and reliable payments.

The payment is accepted by a retail system which may be any system capable of accepting a payment. Typically, the retail system will include a retail terminal, such as a terminal of a type currently used in retail outlets. The retail terminal may be arranged to implement the entire payment process and the communication with the transaction control system. In this case, the retail system is constituted by the reader and the retail terminal together. However, this is not essential and the various functions of the retail system may be implemented in separate units. For example, the retail system may comprise a combination of a conventional retail terminal which implements the payment process and an additional terminal which implements the communication with the transaction control system. In this case, the additional terminal may be connected to the reader. This arrangement is advantageous in that it allows the present invention to be invented by a retail terminal already provided in a retail outlet, but by adding the additional terminal and reader.

Alternatively, some of the payment processing may occur remotely from the retail terminal. For example, the retail system may comprise a retail terminal which can communicate with a host server, e.g. over a local area network. In this case, the host server may perform the payment process and the retail terminal primarily acts to control the interaction with the consumer through appropriate data input means such as a keyboard or touch screen and/or means for reading a credit card. Whatever the nature of the retail system, it includes some means for accepting payment from the consumer.

The payment may be in any form, for example by cash or by credit card. In the case of a cash transaction, where a retail terminal implements the payment processing, the means for accepting payment may be the keyboard and associated processing which allows physical receipt of cash to be confirmed by appropriate operation of keys on the keyboard. In the case of an unmanned retail terminal, the means for accepting payment may be an appropriate mechanical system, for example as used in known vending machines. In the case of payment by credit card, the means for effecting payment may be a conventional device for reading data stored on the credit card or entering the number of the credit card, and the associated processing.

Retail terminals may be provided in a large number of locations, for example, in retail outlets such as shops, or any other establishment where payment may be accepted, such as a ticket booth. Alternatively, the possibility of the retail terminal being unmanned allows retail terminals to be provided at a larger number of locations.

The reader may be provided as an integral part of the retail terminal or may be a separate unit connected to the retail terminal.

The present invention provides a payment system which provides advantages to each of the users, the retailers and the mobile network operators.

As far as users are concerned, the present invention provides the advantage of simplicity of use and understanding. There is no need to use anything other than the mobile radio apparatus itself. There is no need to purchase a voucher or to carry a magnetic stripe card. The user needs merely to visit a retail outlet or other location

having a retail system, to display the image including the graphical representation of data and to make the payment. These are all routine tasks. In particular, display of the image may be achieved using existing functionality of the mobile radio apparatus. Users do not need to enter a PIN as is necessary for validation in voucher payment systems or a PAN as is necessary for validation of the magnetic stripe card of the electronic payment system. This is because the graphically represented data corresponds to an account database record.

It is therefore expected that the present invention will be readily accepted by consumers.

From the point of the retailer, the system is again simple to use and understand. The retailer simply uses a reader to read the displayed image. This requires relatively little retailer training because it is a straightforward task, similar to that routinely used to read barcodes to identify products in many shops such as supermarkets. Thereafter, the retailer need only control the retail system to accept the payment, in the same manner as for any other purchase, for example by accepting cash or a credit card payment. Indeed, the task at the retailer is so straightforward that it is possible to implement an automatic retail terminal which is operated directly by the consumer using technology similar to that in a vending machine to accept payment. Also, the retailer does not need to hold any stock as is necessary with the voucher payment system. Thus the retailer never has voucher supply problems and there is a reduced risk of fraud to the retailer.

As far as the mobile network operators are concerned, a significant advantage is that a high take-up by users and retailers is likely due to the advantages described above. In addition, the payment system is simple to implement. There is no need to manufacture and distribute vouchers or electromagnetic cards. There is no need for an IVR system for validation. It is expected that a payment system in accordance with the present invention will be cheaper to implement than the existing payment systems described above.

Also, the present invention provides a relatively flexible system which can be adapted, for example to change the payment amount or to introduce conditions on desired transactions, as will be described further below.

It is also noted that the present invention does not necessitate changes to the mobile radio apparatus, such as new or updated software or SIM changes (although these might be useful optional features). This is because the present invention uses an image which may be displayed using the existing functionality of the mobile radio apparatus to display images. As the images are read passively, there is no need for any form of active transmission of data such as infrared transmission or electromagnetic transmission, e.g. Bluetooth.

Preferably, the transaction control system further stores transaction database records of desired transactions for respective mobile radio apparatus accounts, and said data corresponding to an account database record included in said transaction data is data which identifies a transaction database record.

The use of transaction database records, in addition to account records, has the advantage that the transaction database records store information about the desired transaction. This may be used to facilitate the transaction. For example, the transaction database record might include the payment amount or conditions which might be used at the time when payment is accepted. In this case, the data included in the graphically represented transaction data displayed on the mobile radio apparatus identifies a transaction database record. It therefore corresponds to an account database record because the identified transaction database record contains information about a transaction in respect of a particular mobile radio apparatus account.

However, it is not essential to implement the present invention using a transaction database record. Instead, the data included in the graphically represented transaction data displayed on the mobile radio apparatus may directly identify an account database record.

Preferably, the transaction control system stores the account database records and the transaction database records in an account database and a transaction database, respectively, which databases are separate from each other, each transaction database

record including an account number identifying an account database record in the account database, the transaction control system further comprises extraction means for extracting, from the transaction database record identified by the communicated data, the account number of a mobile radio apparatus account in the account database, and the account update means is arranged to update, in the account database, the account database record identified by the account number extracted from the transaction database.

The use of a separate account database and transaction database is advantageous, because it allows the present invention to be implemented using an existing account database of a mobile network operator, by newly introducing a transaction database. It also allows the present invention to be implemented using a single transaction database in combination with plural account databases, for example for different mobile network operators. This in turn facilitates implementation of the present invention in a common manner for different mobile networks. Lastly, the use of a separate transaction database facilitates the application of the present invention to several different products besides crediting a mobile radio apparatus account (as discussed in more detail below) using a single transaction database.

To implement the account database and transaction database separately, the databases may be provided in a separate account server and transaction server, respectively, with a communications link therebetween.

However, it is not essential to provide the transaction database and account database separately. Alternatively, the transaction database records could be provided in the same database as the account database records, for example by the transaction database records each forming part of a respective account database record in respect of a particular account.

Preferably, the image is a message received by the mobile radio apparatus. For supplying the message, the transaction control system may include transmission means for transmitting a message comprising an image including a graphical representation of transaction data which includes data corresponding to an account database record.

Supplying the image as a message takes advantage of the existing messaging functionality of the mobile radio apparatus. This allows straightforward storage of the images, because storage of received messages is an integral part of the existing messaging functionality. Thus, the present invention may be achieved without any special software on the mobile radio apparatus. It also provides for ease of use by the user.

The transmission of the graphical representation of data in a message, also allows additional content to be included in the message, together with the graphically represented data. In general, the additional content may be of any nature, including advertising material or other information addressed to the user. This conduit for additional content is of particular advantage to the mobile network operator.

The present invention may use any type of messaging for transmitting a message to a mobile radio apparatus. Currently, SMS messaging is preferred, but other types of messaging are equally possible, for example MMS, EMS or WAP.

Despite the advantages of the image being transmitted in the form of a message, this is not essential. It would alternatively be possible to transmit the transaction data to the mobile radio apparatus in a data format, from which the mobile radio apparatus would generate the graphical representation. This would, however, require appropriate software to be provided on the mobile radio apparatus.

Preferably, the messaging means further includes reception means for receiving a request message from the mobile radio apparatus indicative of the desire to credit the mobile radio apparatus account of the mobile radio apparatus, the transaction control system further includes transaction database record creation means, responsive to the receipt of a message by said reception means, for creating a transaction database record including the data identifying the account of the mobile radio apparatus from which a message is received, and said transmission means is responsive to the creation of a transaction database record by said transaction database record creation means for transmitting a message comprising an image including a graphical representation of transaction data which includes data identifying the created transaction database record.

In this way, both the transaction database record and the message including the graphical representation transaction data are created in response to a request message from the mobile radio apparatus.

This technique also allows accurate recording of the correct telephone number, or other data identifying the account, for the desired transaction in the transaction database record, because the mobile radio apparatus may be identified directly from the request message.

The request message also provides the advantage of providing a simple mechanism by which the user can register the desire to credit the account simply by sending a request message to a predetermined number.

One possibility is for the request message to be blank so that mere receipt of a message at a predetermined telephone number indicates the desire to credit the account. In this case, different telephone numbers might be used to designate different payment amounts, or the payment amount might not be specified at all. Another possibility is for the text message to include simple text identifying the desired payment amount.

However, the use of such a request message is not essential. A request could be made by any other means, for example a voice call. Alternatively, messages including the graphical representation of data could be transmitted to mobile radio apparatuses in an unsolicited manner.

There are several ways for the retail system to identify the payment amount, as follows:

A first option for identifying the payment amount is that the transaction data further includes the payment amount and the payment means is arranged to accept the payment of the payment amount read as part of the transaction data. This option is advantageous in that it avoids the need to obtain the desired payment amount from the transaction database record. It therefore speeds up the payment process.

A second option for determining the payment amount is that each transaction database record includes the payment amount, the transaction control system includes retrieval means, responsive to the data identifying a transaction database record

communicated from the retail system, for retrieving the payment amount from the transaction database record identified by the communicated data and communicating the retrieved payment amount to the retail system, and the payment means is arranged to accept the payment of the payment amount communicated from the transaction control system.

This option has the advantage of the payment amount being automatic and accurately supplied to the retail system from the relevant transaction database record.

A third option is for the user to specify the payment amount. In this case, the retail system has input means for inputting the payment amount during the payment processing. Similarly, this third option could be applied to change the payment amount identified using the first or second options. If the payment amount is specified by the user, then it is communicated from the retail system to the transaction control system in a similar manner to the data identifying a transaction database record and the data indicating that payment has been accepted.

Advantageously, the transaction control system includes authorization means, responsive to the data identifying a transaction database record communicated from the retail system, for checking the transaction database record identified by the communicated data and communicating an authorization to the retail system if a predetermined criterion is met, and the payment means is arranged to inhibit payment until receipt of the authorization by the retail system.

Inclusion of such an authorization process is advantageous because it allows the transaction to be controlled by the transaction control system. A wide variety of predetermined criterion may be used, from a simple check that a proper transaction database record is identified to checking whether conditions specified in the transaction database record are met. Numerous conditions are possible. For example, the conditions might specify a particular time period outside which the authorization is not to be provided, to enable the transaction database records to "expire" at a certain date.

Thus, it can be seen that such an authorization process can provide a wide, flexible range of additional functions which can reduce both errors and fraud, and/or can provide additional functionality to the payment system.

The present invention is particularly applicable to a mobile radio apparatus in the form of a mobile telephone, but may equally be applied to any other form of mobile radio apparatus, for example a portable digital assistant or indeed any apparatus capable of radio communication over a mobile network.

Preferably, the graphical representation is a two-dimensional barcode. Two-dimensional barcodes are conventional in themselves. Their use with the present invention allows known technology to be applied to form and read the graphically representation of the transaction data. The use of a two-dimensional barcode also provides the advantage of being able to represent large amounts of information in a restricted area.

Any format for the two-dimensional barcode may be applied. Preferably the barcode format is QR Code, but other possible formats include PDF417, Code 16K, Code 49, DataMatrix, Maxicode, Code One or Aztec Code. Although a stacked two-dimensional barcode may be used, preferably a matrix two-dimensional barcode is used because of the inherent advantages of increasing the amount of data stored. The ability to store large amounts of data also provides the advantage that the barcodes may incorporate error correction capability to allow recovery from data corruption, as well as other encoding algorithms, for example to enhance security.

Optionally, the graphically represented data may be encrypted.

While two-dimensional barcodes are preferred, the graphical representation of data may be in any other format which allows the data to be read by a reader at the retail system. This includes one-dimensional barcode or, representation of the data by characters to be read by a reader incorporating an optical character recognition system.

The present invention is described above as a payment system and method for crediting an account of a mobile radio apparatus. However, the present invention may equally be applied to payment for products other than the crediting of an account for a mobile telephone apparatus. Indeed, the present invention may be applied to payment for any products, including tangible products such as goods, including ticketing, and intangible products such as services.

Thus, in accordance with a third aspect of the present invention there is provided a method of payment for a product using:

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of data;

a retail system having a reader capable of reading graphically represented data displayed on the display of said mobile radio apparatus; and

a transaction control system remote from the retail system, the retail system and the transaction control system being capable of communicating over a communications link, the transaction control system storing transaction database records of desired transactions each including data identifying a desired product,

the method comprising:

displaying on the display of the mobile radio apparatus an image including a graphical representation of transaction data which includes data identifying a transaction database record;

using the reader of the retail system to read the graphically represented transaction data displayed on the display of the mobile radio apparatus;

using the retail system to accept a payment;

communicating from the retail system to the transaction control system, the read data identifying a transaction database record and data indicating that payment has been accepted;

updating the transaction database record identified by the communicated data to indicate that payment has been accepted; and

delivering the product identified in the identified transaction database record.

According to a fourth aspect of the present invention, there is provided a payment system comprising:

a transaction control system storing transaction database records of desired transactions each including data identifying a desired product;

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of transaction data which includes data identifying a transaction database record;

a retail system remote from the transaction control system; and
a communications link between the retail system and the transaction control system,

the retail system comprising:

a reader capable of reading graphically represented transaction data displayed on the display of the mobile radio apparatus;

payment means for accepting a payment; and

means for communicating the read data identifying a transaction database record and data indicating that payment has been accepted over the communications link to the transaction control system;

the transaction control system comprising:

means, responsive to the data communicated from the retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted.

Similarly, the various features of the present invention as applied to crediting an account for a mobile radio apparatus may be generalized to any other products as follows. Instead of maintaining and updating account database records, appropriate means for delivering the product in question are provided. The manner of delivery will depend on the product in question, but includes generating an order for a supplier to supply a product, communication of data to instruct a service provider to provide a service, or where a product is intangible and represented by database records, updating that database record.

When applied to payments for products in general, the present invention provides the same advantages as described above with reference to crediting an account for a mobile radio apparatus. The present invention is particularly useful in that it provides a mechanism for allowing a consumer to pay for a product at any of a large number of retail locations, but without the retailer needing to be involved in the delivery of the product.

To allow better understanding, an embodiment of the present invention will now be described by way of non-limitative example with reference to the accompanying drawings, in which:

Fig. 1 is a two-dimensional barcode which constitutes graphically represented data;

Fig. 2 is a schematic diagram of the payment system which embodies the present invention;

Fig. 3 is a schematic view of a barcode reader, and

Fig. 4 is a perspective view of an illumination unit of the barcode reader of Fig. 3 viewed from inside the reader.

A payment system which embodies the present invention is described below.

In the payment system, the graphical representation of data is a two-dimensional barcode, in particular a matrix barcode in the format known as QR Code. Fig. 1 illustrates an example of such a QR code barcode 1. QR Code is defined in ISO/IEC 18004. QR Code has the advantage of providing an error correction capability to allow recovery from data corruption during the reading process. QR Code is capable of representing large amounts of data with a high data density. QR Code also includes the provision of position detection patterns on three comers which allows omni-directional reading.

Handling of the QR Code barcode 1 may be performed using known techniques in accordance with the QR Code format. The payment system uses a known encoding algorithm for encoding a data string into a QR Code barcode 1 graphically representing that data string. Similarly, the present invention uses known technology for reading the barcode. As will be described in more detail below, this involves detecting an image of the barcode, and decoding the image data using a known decoding algorithm for QR Code to obtain the graphically represented data.

The payment system is illustrated schematically in Fig. 2. In particular, Fig. 2 shows the elements of the payment system, including various functional blocks included therein.

—The payment system includes a mobile radio apparatus in the form of a mobile telephone 10. The mobile telephone 10 is of known construction. It includes a radio communication circuit 11 for providing communication with a mobile network 20 which is also of known form. In particular, the mobile network 20 consists of a number of distributed base stations which may be interconnected by land-lines, which ultimately interface to other switched networks such as the Public Switched Telephone Network (PSTN). The radio communication circuit 11 communicates with a local base station to provide radio communication between mobile telephone 10 and the mobile network 20. The mobile network 20 may be one of the existing mobile networks, for example in the case of the United Kingdom those currently operated by Vodafone, Orange, T-mobile or 0₂. Of course the payment system may include many mobile telephones 10, which may operate over different mobile networks 20.

The mobile telephone 10 also comprises a microprocessor 12, a memory 13, a keyboard 14 which acts as an input means for the user, and a display 15.

The microprocessor 12 runs software to control operation of the mobile telephone 10, providing a variety of functions. One of the functions is to receive and handle messages, in an SMS format or any other messaging format. SMS stands for Short Message Service. SMS messaging currently allows messages of up to 160 alphanumeric and punctuation characters to be sent quickly and cheaply between mobile telephones. The messages may include images. The messages are received over the mobile network 20 using the radio communication circuit 11, and are stored in the memory 13. Using the keyboard 14 to input commands, the stored messages may be selectively displayed on the display 15.

.. As will be described in more detail below, the payment system relies on the mobile telephone 10 receiving a message including an image which includes a barcode 1 which graphically represents transaction data. The existing functionality of the mobile telephone 10 allows the user to display the message including the barcode 1 on the display 15.

The payment system further includes multiple retail terminals 30, one of which is shown in Fig. 2. The retail terminals 30 are provided in retail locations such as shops. Each retail terminal 30 has a reader 40 which is capable of reading the barcode 1, that is to read the transaction data graphically represented by the barcode 1. The retail terminal 30 and the reader 40 together constitute a retail system.

The retail terminal 30 and the reader 40 are linked together for communication by a cable 31. The reader 40 has an input/output interface 50 for communicating data to the retail terminal 30 and for accepting commands from the retail terminal 30 for control of the reader 40. The reader 40 operates under the control of a microprocessor 41 running appropriate software.

The reader 40 further includes a data reading system 42 which will now be described in more detail with reference to Figs. 3 and 4.

Fig. 3 schematically illustrates the components of the data reading system 42 which are as follows.

A window 43 is provided in the housing (not shown) of the reader 40. A charge coupled device (CCD) 44 is disposed inside the window 43 with a lens 45 arranged to focus images of objects spaced adjacent to the window 43 onto the CCD 44. The CCD 44 captures an image of the object. In use, the display 15 of the mobile telephone 10, with the barcode 1 displayed thereon, is placed adjacent the window 43 so that the CCD 44 captures an image of the barcode 1.

In addition, the data reading system 42 includes an illumination unit for illuminating an object placed adjacent the window 43 as illustrated in Fig. 4. The illumination unit comprises a plurality of light emitting diodes (LEDs) 46 which are arranged as illustrated in perspective view in Fig. 4. The LEDs 46 are arranged to provide indirect illumination. This is achieved by arranging the LEDs 46 around the periphery of the window 43. To provide shadow-less illumination, the LEDs 46 direct light towards the window 43 through a screen 47 arranged to diffuse the light emitted by the LEDs 46. The screen 47 may be formed of any suitable diffusive material, for example a frosted plastic. The illumination unit consisting of the LEDs 46 and the screen 47 is particularly advantageous for reading a barcode 1 displayed on the display 15

of the mobile telephone 10, because the image will typically be of very low contrast, particularly if the display 15 is not illuminated.

Optionally, the LEDs 46 may be switched on and off, under the control of the microprocessor 41, to indicate when the reader 40 is ready for use.

The data reading system 42 further includes a memory 48 to which the contents of the CCD 44 are periodically transferred, typically at around 25Hz. The microprocessor 41 runs conventional software to recognise when an image of the barcode 1 is stored in the memory 48 by recognising identifying characteristics of a QR Code barcode. Upon such recognition, the software uses a known decoding algorithm, as described above, to obtain the transaction data graphically represented by the barcode 1. The decoding algorithm may incorporate error correction. On successful reading of the transaction data, the software causes sounding of a beeper provided in the reader 40. If no barcode is recognized, then the next image captured by the CCD 44 is loaded into the memory 48 and the process repeats.

The reader 40 communicates the read transaction data to the retail terminal 30 using the input/output interface 50. Once the transaction data has been successfully read, the software causes the microprocessor 41 to examine successive images loaded into the memory 48 to determine when the barcode 1 has been moved away. At that point, the reader 10 repeats the process to read a further barcode 1.

The retail terminal 30 is of a conventional type for processing payment in a retail location. It includes a keyboard 32 as an input means for operating the retail terminal 30. It also includes a display 33, such as an LCD display, used to display information during the payment process, for example the payment amount and the nature of the product. The retail terminal 30 further includes a printer 34 which may be used to print receipts.

The retail terminal 30 is controlled by a control process 35 which may be implemented by software running on a microprocessor. The control process 35 causes the retail terminal 30 to operate in a manner which will be described in more detail below.

—The control process 35 includes payment processes for accepting payments, for example cash payments or electronic payments, e.g. by credit card. For accepting payments by cash, the payment processing includes a step of data entry through the keyboard 32 to confirm physical receipt of the cash. For accepting payments by credit card, the retail terminal 30 may include a credit card reader (not shown) for reading the credit card details and the payment processing includes steps of communicating with the credit card provider. Such payment processes are in themselves conventional, but the control process 35 includes further steps specific to implementing the invention, as described in more detail below.

The retail terminal 30 further includes an input/output interface 36 provided for communication with the reader 40 over the cable 31. In particular, the input/output interface 36 allows the retail terminal 30 to receive transaction data from the reader 40 and to issue commands to control the reader 40.

The retail terminal 30 also includes a modem 37 allowing the retail terminal 30 to communicate over a switched telephone network 55 which may be the PSTN or any other switched network. The switched telephone network 55 is used as a communications link between the retail terminal 30 and a transaction control system 60, described in more detail below. In principle, the switched telephone network 55 could be replaced by any other communications link, but the switched telephone network 55 is preferred for ease of implementation, in particular because it is allowed using communications with a large number of existing retail locations without necessitating additional infrastructure.

The payment system further comprises a transaction control system 60 consisting of a transaction server 70, an account server 80 and a messaging server 90. Each of the servers 70, 80 and 90 are arranged in different locations. The transaction server 70 and the account server 80 communicate over a first private network 61. The transaction server, 70 and the SMS server 90 communicate over the second private network 62. The first and second private network 61 and 62 may be a network of any suitable form allowing communication between the servers 70, 80 and 90. They will typically be networks providing a high degree of security. The first and second private

networks 61 and 62 may be constituted by the same or different networks. In principle, the first and second private networks 61 and 62 could be replaced by any form of communication link allowing communication between the servers 70, 80 and 90.

Each of the servers 70, 80 and 90 is a computer system of conventional construction. The servers 70, 80 and 90 run software to implement the present invention as described in more detail below. Whilst the use of a separate transaction server 70, account server 80 and messaging server 90 is preferred, alternatively the functionality of any of the servers 70, 80 and 90 may be combined in the same server.

The servers 60, 70 and 80 store various databases consisting of database records which include a key used to locate database records within the database in a 10 conventional manner.

The transaction server 70 is arranged as follows.

The transaction server 70 has first and second interfaces 71 and 72 for communicating with the accounts server 80 and the messaging server 90, respectively, over the first and second private networks 61 and 62, respectively. In addition, the transaction server 70 includes a third interface 73 for communication with the retail terminal 30 over the switched telephone network 55. The transaction server 70 has a control process 74 which may be implemented by a processor running appropriate software. The control process 74 controls the operation of the transaction server 70 to implement the present invention as described in more detail below. Under the control of the control process 74, the transaction server 70 maintains a transaction database 75 and a key database 76.

The transaction database 75 stores records of desired transactions for respective mobile radio apparatus accounts. In particular, the transaction database records each comprise:

- data identifying a particular mobile network operator;
- the telephone number of a particular mobile telephone 10; and
- the desired payment amount.

The mobile telephone number is used as the key for the transaction database records of the transaction database 75. As described in more detail below, the

telephone number stored as part of the transaction database record is used as data to identify the account of the mobile telephone 10.

The records of the key database 76 consist of mobile telephone numbers which are used as the keys to the transaction database 75. The keys for the key database 76 are randomly generated numbers.

In use, the randomly generated keys are included in the transaction data represented by the barcodes in the mobile telephone 10. As the records of the key database 76 are mobile telephone numbers which correspond to a mobile telephone account, the keys for the key database 76 similarly correspond to a mobile telephone account. As described in more detail below, the keys for the key database 76 are used to identify a transaction database record in the transaction database 75 which in turn are used to identify a mobile telephone account. A particular transaction database record in the transaction database 75 is located using the key database 76 to link the randomly generated key in the transaction data to a particular transaction database record.

The account server 80 is the existing account of a particular network operator. The payment system may include plural account servers 80 of different network operators. The account server 80 is arranged as follows.

The account server 80 has an interface 81 for communicating with the transaction server 70 over the first private network 61.

The account server 80 has a control process 82 which may be implemented by a processor running appropriate software. The control process 82 controls the operation of the account server 80 to implement the present invention as described in more detail below.

The account server 80 stores an account database 83 consisting of account database records which are each a record of information concerning a respective mobile telephone account. The account database records include various information about the account, including an amount of credit. As the mobile telephone 10 is used, the amount of

credit in the account database record for the account in respect of that mobile telephone 10 is reduced. Typically, the account database records will include much other information as well, for example information about the user and the type of account. The mobile telephone number may be used as a key to the account database records in the account database 83.

The messaging server 90 is arranged as follows.

The messaging server 90 has an interface 91 for communicating with the transaction server 70 over the second private network 62.

The messaging server 90 further includes a SMS messaging interface 92 for sending and receiving SMS messages over the mobile network 20. In use, the SMS messaging interface 92 is used to send message to, and receive messages from, the mobile telephone 10. In particular, the SMS messaging interface 92 has one or more telephone numbers to which the mobile telephone 10 can send messages. In the event that the payment system is applied to plural mobile networks 20, there may be a separate messaging interface 92 for each mobile network 20.

The messaging server 90 has a control process 93 which may be implemented by a processor running appropriate software. The control process 93 controls the operation of the messaging server 90 to implement the present invention as described in more detail below.

The messaging server 90 further includes encoding software 94 for encoding data into a QR Code barcode 1.

Operation of the payment system will now be described. The operation is controlled by the control process 35, the control process 74, the control process 82 and the control process 93 of the retail terminal 30, the transaction server 70, the account server 80 and the messaging server 90, respectively. In this manner, the control processes 35, 74, 82 and 93 constitute means for forming various functions corresponding to the various means defined in the claims.

The first stage is a registration. This is initiated by the user sending a request message from the mobile telephone 10 to the messaging server 90 to indicate the desire to credit the account of the mobile telephone 10.

The request message may be prepared using the messaging functionality of the mobile telephone 10. The request message is sent to a telephone number of the messaging server 90. The user might be informed of the appropriate telephone number of the messaging server 90 in advance, for example as part of a mail-shot or by a directed SMS message.

The content of the SMS message may also indicate the nature of the desired product, that is indicating crediting of a mobile telephone account, and also the desired payment amount. For example, the message format might be "topup10" to indicate a top-up by £10. As an alternative, a different telephone number might indicate different desired payment amounts, in which case the message might include no content at all.

On receipt of the request message, the messaging server 90 assembles the 10 following information:

- the desired payment amount, as included in the text of the request message, or alternatively as indicated by the telephone number to which the request message is sent;
- the network operator of the mobile network 20, of the mobile telephone 10, which is known from the identity of the mobile network 20 from which the request message is received; and

- the telephone number of the mobile telephone 10 which is also known from the additional information accompanying the request message, for example the MSISDN field of the transmission record containing the request message.

In the event that the content of the request message cannot be successfully parsed, then the messaging server 90 replies to the request message with a message explaining the error and suggesting ways of avoiding similar errors in the future.

The assembled data is then transmitted from the messaging server 90 to the transaction server 70.

The transaction server 70 creates a transaction database record using the data transmitted from the messaging server 90. The transaction database record includes all the data transmitted from the messaging server. The telephone number of the mobile telephone 10 is used as a key to the created transaction database record. In addition, a key database record is created in the key database 76. The key database record comprises

the mobile telephone number of the mobile telephone 10. A number is randomly generated using a pseudo-random number generator. The randomly generated number is checked to be unique against the keys already stored as keys in the key database 76. Provided it is unique, the randomly generated number is stored as the key to the newly created key database record. If it is not unique, a new random number is generated and the checking process is repeated.

The transaction server 70 then assembles the key and a product code, which is data identifying the product, that is the network operator of the mobile network 20 and the desired payment amount. The product code is extracted from a table stored on the transaction server 70 containing product codes for all possible combinations of mobile operators and payment amounts. Later, the product code is used to identify both the mobile network operator and the payment amount at the retail terminal 30. The key to the created key database record in the key database 76 is later used as data to identify the desired transaction database record in the transaction database 75 because it used to retrieve the telephone number in the record of the key database 76 which in turn is used to access the transaction database. Furthermore, the key to the created key database record in the key database 76 corresponds to an account database record, because the transaction database record in the transaction database 75 identified thereby includes the telephone number of a particular mobile telephone 10 which may be used as a key to identify an account database record in the account database 83. The key and the product code, which are both numeric, constitute transaction data in the following process. The transaction data is transmitted back to the messaging server 90.

On receipt of the transaction data, the messaging server 90 uses the encoding software 94 to generate a barcode 1 which is a graphical representation of the transaction data. The messaging server 90 then constructs a message including the barcode 1. This message may also include further content such as information for the user or advertising material. The messaging server 90 then transmits the message to the mobile telephone 10 over the mobile network 20.

On receipt of the message, the user may view the message on the display 15 and store it in the memory 13 using the keyboard 14 to control the messaging functionality of the mobile telephone 10.

At a time of the user's choosing, the user visits a location having a retail terminal 30 equipped with a reader 40 to pay for a top-up. The keyboard 32 of the retail terminal 30 is operated by the retailer to perform the process for a barcode-activated top-up. This causes the retail terminal 30 to send a command to the reader 40 to commence reading.

The user operates the mobile telephone 10 to display the received message including the barcode 1 on the display 15, and then positions the mobile telephone 10 with the displayed barcode 1 adjacent the window 43 of the reader 40.

The reader 40 reads the transaction data represented by the barcode 1, in the manner described above, and transmits the transaction data to the retail terminal 30.

The retail terminal 30 extracts the product code from the transaction data and uses it to determine the payment amount and the mobile network operator by reference to a table stored in the retail terminal 30 identical to the table used by the transaction server 70 to generate the product code. The retail terminal 30 then displays this information on the display 33 for checking with the user.

At this point, there is an optional authorization stage. The authorization stage starts with the retail terminal 30 transmitting the key of the key data base 76, which is read as part of the transaction data, to the transaction server 70. Next, the transaction server 70 uses the received key to check the transaction database record in the transaction database 75 identified by the key, using the key database 76. The transaction server 70 determines whether a predetermined criteria is met. Various criteria are possible. Indeed the possibility to select different criteria provides the authorisation step with significant flexibility.

A simple criteria is simply to check that a corresponding transaction database record actually exists in the transaction database 75.

A more complicated criteria is to check the transaction database record correlates with the product code read by the reader 40 as part of the transaction data. This of

course requires that the retail terminal 30 additionally communicates the product code to the transaction servers 70.

Other possible criteria include checking conditions represented by data in the transaction database record. For example, the transaction database record might specify a time period outside which authorization is not given or a deadline after which authorization is not given. This allows the transaction database record to expire after a certain time. It is envisaged that any other types of condition might be implemented.

If the predetermined criteria is met, the transaction server 70 communicates an authorization to the retail terminal 30. The retail terminal 30 is inhibited from accepting the payment unless the authorization is received.

The next step is for the retail terminal 30 to accept the payment. In itself, the payment process is a conventional process for receiving a payment, for example by cash or by credit card.

The payment amount is displayed on the display 33 of the retail terminal 30. There are several options to identify the payment amount for the payment process.

A first option is that the payment amount is identified from the product code read as part of the transaction data.

A second option is for the payment amount to be retrieved from the transaction database 75 of the transaction server 70. To achieve this, the key of the key database 76 is transmitted from the retail terminal 30 to the transaction server 70 which uses the transmitted key to retrieve the payment amount from the corresponding transaction database record using the key database 76. The retrieved payment amount is then transmitted back from the transaction server 70 to the retail terminal 30.

A third option is for the payment amount to be input to the retail terminal 30 using the keyboard 32, at the time of making the payment. This option may be used instead of the first or second options, or may be used to change the payment amount identified by using the first or second option.

A modification of the third option is for the transaction data to identify one of a plurality of menus stored on the retail terminal 30. The menus each include a 30 different set of possible payment amounts. The menu identified by the transaction data

is displayed on the display 33 and one of the displayed amounts is selected by operation of the keyboard 32 to input the payment amount. Such menus may be periodically downloaded from the transaction server 70 to the retail terminal 30.

Once the payment process is completed, the retail terminal 30 sends data to the transaction server 70 confirming that the payment has been accepted, as well as the transaction data read by the reader, including both the product code and the key of the key database 76.

On receipt of this data, the transaction server 70 updates the transaction database record in the transaction server, 70 identified by the key to indicate that payment has been accepted. The transaction server 70 also accesses the transaction database record in the transaction database 75 using the key and assembles the following data:

- the network operator;
- the telephone number of the mobile telephone 10; and
- any other additional information required by the account server 80, this depending on the interface specifications of the account server 80.

The assembled data is transmitted from the transaction server 70 to the account server 80.

On receipt of this data, the account server 80 updates the account database record in the account database 83 identified by the mobile telephone number received from the transaction server 70. In particular, the account server 80 credits the account by the payment amount identified in the data from the transaction server 70. On successful updating of the account database 83, the account server 80 transmits a confirmation record back to the transaction server 70 to confirm updating of the account database 83, and additional information such as the new balance of the mobile telephone account. Alternatively, if the update of the account database 83 is unsuccessful, then the account server 80 transmits a failure record to the transaction server 70 indicating the failure.

On receipt of a confirmation record from the account server 80, the transaction server 70 creates two records, firstly a confirmation record for the messaging server 90 containing the mobile telephone number and the new balance, and secondly a confirmation record for the retail terminal 30 with the new balance. These records are then sent to the messaging server 90 and the retail terminal 30, respectively.

On receipt of a confirmation record, the retail terminal 30 displays information on the display 33 to indicate the new balance and causes the printer 34 to print receipts, for example a copy for the user and a copy for the retailer.

On receipt of the record confirmation, the messaging server 90 constructs a message containing the new balance, and sends this message to the mobile telephone 10 over the mobile network 20. This message therefore confirms to the user that the account has been properly credited.

In the event of the transaction server 70 receiving a message from the account server 80 to indicate that the updating of the account database was unsuccessful, then the transaction server 70 creates two failure records, to indicate this failure, firstly for the messaging server 90 and secondly for the retail terminal 30. The failure records are then sent to the messaging server 90 and the retail terminal 30, respectively.

On receipt of a failure record, the retail terminal 30 undergoes a process to cancel the payment process and refund the payment.

The messaging server 90, on receipt of a failure record indicating a failed top-up the messaging server 90 constructs an appropriate message and sends this to the mobile telephone 10 over the mobile network 20.

It will be appreciated that the payment system described above is merely one way of implementing the invention and numerous modifications to the hardware and software are possible.

Claims

1. A method of crediting a mobile radio apparatus account using:
 - a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of data;
 - a retail system having a reader capable of reading graphically represented data displayed on said display of said mobile radio apparatus; and
 - a transaction control system remote from the retail system, the retail system and the transaction control system being capable of communicating over a communications link, the transaction control system storing account database records of mobile radio apparatus accounts, each account database record including an amount of credit; andthe method comprising:
 - displaying on the display of the mobile radio apparatus an image including a 15 graphical representation of transaction data which includes data corresponding to an account database record;
 - using the reader of the retail system to read the graphically represented transaction data displayed on the display of the mobile radio apparatus;
 - using the retail system to accept a payment;
 - communicating from the retail system to the transaction control system, the read data corresponding to an account database record and data indicating that payment has been accepted;
 - updating the account database record corresponding to the communicated data to credit the mobile radio apparatus account by the payment amount.
2. A method according to claim 1, wherein the transaction control system further stores transaction database records of desired transactions for respective mobile radio apparatus accounts, and said data corresponding to an account database record included in said transaction data is data which identifies a transaction database record.
3. A method according to claim 2, wherein

the account database records and the transaction database records are stored in an account database and a transaction database, respectively, which databases are separate from each other, each transaction database record including data identifying an account database record in the account database,

said step of updating the account database record comprises:

extracting, from the transaction database record identified by the communicated data, the data identifying an account database record in the account database; and

updating the account database record in the account database identified by the data extracted from the transaction database to credit the mobile radio apparatus account by the payment amount.

4. A payment system for crediting a mobile radio apparatus account comprising:
 - a transaction control system storing account database records of mobile radio apparatus accounts, each account database record including an amount of credit; and
 - a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of transaction data which includes data corresponding to an account database record;
 - a retail system remote from the transaction control system; and
 - a communications link between the retail system and the transaction control system,
- the retail system comprising:
 - a reader capable of reading graphically represented transaction data displayed on said display of said mobile radio apparatus;
 - payment means for accepting a payment; and
 - means for communicating the read data corresponding to an account database record and data indicating that payment has been accepted over the communications link to the transaction control system;

the transaction control system comprising account update means for updating the account database record corresponding to the communicated data to credit the mobile radio apparatus account by the payment amount.

5. A payment system according to claim 4, wherein the transaction control system further stores transaction database records of desired transactions for respective mobile radio apparatus accounts, and said data corresponding to an account database record included in said transaction data is data which identifies a transaction database record.
6. A payment system according to claim 5, wherein the transaction control system further comprises transaction update means, responsive to the data communicated from the retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted.
7. A payment system according to claim 5 or 6, wherein the transaction control system stores the account database records and the transaction database records in an account database and a transaction database, respectively, which databases are separate from each other, each transaction database record including data identifying an account database record in the account database, the transaction control system further comprises extraction means for extracting, from the transaction database record identified by the communicated data, the data identifying an account database record in the account database, and said account update means is arranged to update, in the account database, the account database record identified by the data extracted from the transaction database.
8. A payment system according to claim 7, wherein the transaction control system includes:
an account server including said account database and said account update means;

transaction server including said transaction database and said extraction means; and

a communications link between said transaction server and said account server.

9. A payment system according to any one of claims 5 to 8, wherein the transaction control system includes authorization means, responsive to the data identifying a transaction database record communicated from the retail system, for checking the transaction database record identified by the communicated data and communicating an authorization to the retail system if a predetermined criterion is met, and the payment means is arranged to inhibit acceptance of the payment until receipt of said authorisation by said retail system.
10. A payment system according to any one of claims 5 to 9, wherein each transaction database record includes the payment amount, the transaction control system includes retrieval means, responsive to the data identifying a transaction database record communicated from the retail system, for retrieving the payment amount from the transaction database record identified by the communicated data and communicating the retrieved payment amount to the retail system, and the payment means is arranged to accept the payment of the payment amount communicated from the transaction control system.
11. A payment system according to any one of claims 4 to 10, wherein said transaction data further includes the payment amount and the payment means is arranged to accept the payment of the payment amount read as part of the transaction data.
12. A payment system according to any one of claims 4 to 11, wherein the image is a message received by the mobile radio apparatus, and

the transaction control system includes messaging means including transmission means for transmitting a message comprising an image including a graphical representation of transaction data which includes data corresponding to an account database record.

13. A payment system according to claim 12 when appendant from claim 5, wherein

the messaging means further includes reception means for receiving a request message from the mobile radio apparatus indicative of the desire to credit the mobile radio apparatus account of the mobile radio apparatus,

the transaction control system further includes transaction database record creation means, responsive to the receipt of a message by said reception means, for creating a transaction database record including the data identifying the account of the mobile radio apparatus from which a message is received, and

said transmission means is responsive to the creation of a transaction database record by said transaction database record creation means for transmitting a message comprising an image including a graphical representation of transaction data which includes data identifying the created transaction database record.

14. A payment system according to claim 12 or 13, wherein the transaction control system includes:

a transaction server including said transaction database and said transaction update means;

a messaging server constituting said messaging means; and

a communications link between said transaction server and said messaging server.

15. A payment system according to any one of claims 4 to 14, wherein said data corresponding to an account database record, included in said transaction data, consists of a randomly generated number.

16. A payment system according to any one of claims 4 to 15, wherein the mobile radio apparatus is a mobile telephone.
17. A payment system according to any one of claims 4 to 16, wherein the graphical representation is a two-dimensional barcode.
18. A payment system according to any one of claims 4 to 17, wherein the two-dimensional barcode is a matrix barcode.
19. A retail system for use in a payment system according to any one of claims 4 to 18, comprising:
 - a reader capable of reading graphically represented transaction data including data corresponding to an account database record displayed on a display of a mobile radio apparatus;
 - payment means for accepting a payment; and
 - means for communicating the read data and data indicating that payment has been accepted over a communications link to a transaction control system.
20. A retail system according to claim 19, wherein the payment means is arranged to accept the payment of a payment amount read as part of the transaction data.
21. A retail system according to claim 19 or 20, wherein the payment means is arranged to inhibit acceptance of the payment until receipt of an authorization by said retail system.
22. A retail system according to any one of claims 19 to 21, wherein said payment means and said means for communicating are arranged in a single terminal.
23. A transaction control system for use in a payment system according to any one of claims 4 to 18,

the transaction control system storing account database records of mobile radio apparatus accounts, each account database record including an amount of credit, and

the transaction control system comprising account update means for updating the account database record corresponding to the transaction database record identified by the communicated data to credit the mobile radio apparatus account by the payment amount.

24. A transaction control system according to claim 23, wherein
the transaction control system further stores transaction database records of desired transactions for respective mobile radio apparatus accounts, and
said data corresponding to an account database record included in said transaction data is data which identifies a transaction database record.

25. A transaction control system according to claim 24, wherein the transaction control system further comprises transaction update means, responsive to the data communicated from the retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted.

26. A transaction control system according to claim 24 or 25, wherein
the transaction control system stores the account database records and the transaction database records in an account database and a transaction database, respectively, which databases are separate from each other, each transaction database record including data identifying an account database record in the account database,
the transaction control system further comprises:
extraction means for extracting, from the transaction database record identified by the communicated data, the data identifying an account data base record in the account database, and
said account update means is arranged to update, in the account database, the account database record identified by the data extracted from the transaction database.

27. A transaction control system according to any one of claims 24 to 26, wherein
- each transaction database record includes the payment amount, and
- the transaction control system includes retrieval means, responsive to the data identifying a transaction database record communicated from the retail system, for retrieving the payment amount from the transaction database record identified by the communicated data and communicating the retrieved payment amount to the retail system.
28. A transaction control system according to any one of claims 24 to 27, wherein the transaction control system includes authorization means, responsive to the data identifying a transaction database record communicated from the retail system, for checking the transaction database record identified by the communicated data and communicating an authorization to the retail system if a predetermined criterion is met.
29. A transaction control system according to any one of claims 23 to 28, wherein the transaction control system includes messaging means including transmission means for transmitting a message comprising an image including a graphical representation of transaction data which includes data identifying a transaction database record.
30. A transaction control system according to claim 29 when appendant from claim 24, wherein
- the messaging means further includes reception means for receiving a request message from the mobile radio apparatus indicative of the desire to credit the mobile radio apparatus account of the mobile radio apparatus,
- the transaction control system further includes transaction database record creation means; responsive to the receipt of a message by said reception means, for creating a transaction database record including data identifying the account of the mobile radio apparatus from which a message is received, and

said transmission means is responsive to the creation of a transaction database record by said transaction database record creation means for transmitting a message comprising an image including a graphical representation of transaction data which includes data identifying the created transaction database record.

31. A transaction control system according to claim 29 or 30, wherein the transaction control system includes:

a transaction server including said transaction database and said transaction update means;

a messaging server constituting said messaging means; and

a communications link between said transaction server and said messaging server.

32. A transaction server for use in a payment system according to claim 8 or any one of claims 9 to 18 when appendant from claim 8,

the transaction server storing a transaction database of transaction database records of desired transactions, each transaction database record including data identifying an account database record of a mobile radio apparatus account in an account database stored on an account server,

the transaction server comprising:

transaction update means, responsive to data identifying a transaction database record communicated from a retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted;

means for extracting from the transaction database record identified by the communicated transaction data, the data identifying an account database record in the account database; and

means for communicating the extracted data and the payment amount to the account server.

33. A transaction server according to claim 32, wherein

each transaction database record includes the payment amount, and the transaction server includes retrieval means, responsive to the data identifying a transaction database record communicated from the retail system, for retrieving the payment amount from the transaction database record identified by the communicated data and communicating the retrieved payment amount to the retail system.

34. A transaction server according to claim 32 or 33, wherein the transaction server includes authorization means, responsive to the data identifying a transaction database record communicated from the retail system, for checking the transaction database record identified by the communicated data and communicating an authorisation to the retail system if a predetermined criterion is met.

35. A method of payment for a product using:
a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of data;
a retail system having a reader capable of reading graphically represented data displayed on said display of said mobile radio apparatus; and
a transaction control system remote from the retail system, the retail system and the transaction control system being capable of communicating over a communications link, the transaction control system storing transaction database records of desired transactions each including data identifying a desired product,
the method comprising:
displaying on the display of the mobile radio apparatus an image including a graphical representation of transaction data which includes data identifying a transaction database record;
using the reader of the retail system to read the graphically represented transaction data displayed on the display of the mobile radio apparatus;
using the retail system to accept a payment;

communicating from the retail system to the transaction control system, the read data identifying a transaction database record and data indicating that payment has been accepted;

updating the transaction database record identified by the communicated data to indicate that payment has been accepted; and

delivering the product identified in the identified transaction database record.

36. A payment system comprising:

a transaction control system storing transaction database records of desired transactions each including data identifying a desired product;

a mobile radio apparatus having a radio communication circuit and a display capable of displaying an image including a graphical representation of transaction data which includes data identifying a transaction database record;

a retail system remote from the transaction control system; and

a communications link between the retail system and the transaction control system,

the retail system comprising:

a reader capable of reading graphically represented transaction data displayed on said display of said mobile radio apparatus;

payment means for accepting a payment; and

means for communicating the read data identifying a transaction database record and data indicating that payment has been accepted over the communications link to the transaction control system;

the transaction control system comprising:

means, responsive to the data communicated from the retail system, for updating the transaction database record identified by the communicated data to indicate that payment has been accepted.

37. — A payment system for crediting a mobile radio apparatus account constructed and arranged to operate substantially as hereinbefore described with reference to the accompanying drawings.

38. A method of crediting a mobile radio apparatus account substantially as hereinbefore described with reference to the accompanying drawings.

INTERNATIONAL SEARCH REPORT

International Application No
.../IB 03/05665

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04M17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L G07F G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, INSPEC, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 16, 8 May 2001 (2001-05-08) & JP 2001 005883 A (NTT DATA CORP), 12 January 2001 (2001-01-12) the whole document	1-36
P, A	US 2003/086545 A1 (RAUBA RIMAS ET AL) 8 May 2003 (2003-05-08) paragraph '0016! - paragraph '0019! paragraph '0022! paragraph '0033!	1-36
A	DE 100 29 333 A (BERGMANN TJARK) 3 January 2002 (2002-01-03) paragraph '0024! - paragraph '0027!	1-36
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☒ Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search

8 September 2004

Date of mailing of the international search report

15/09/2004

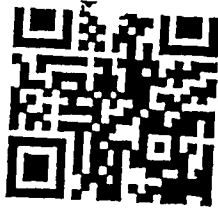
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Fig. 1



1

Fig. 2

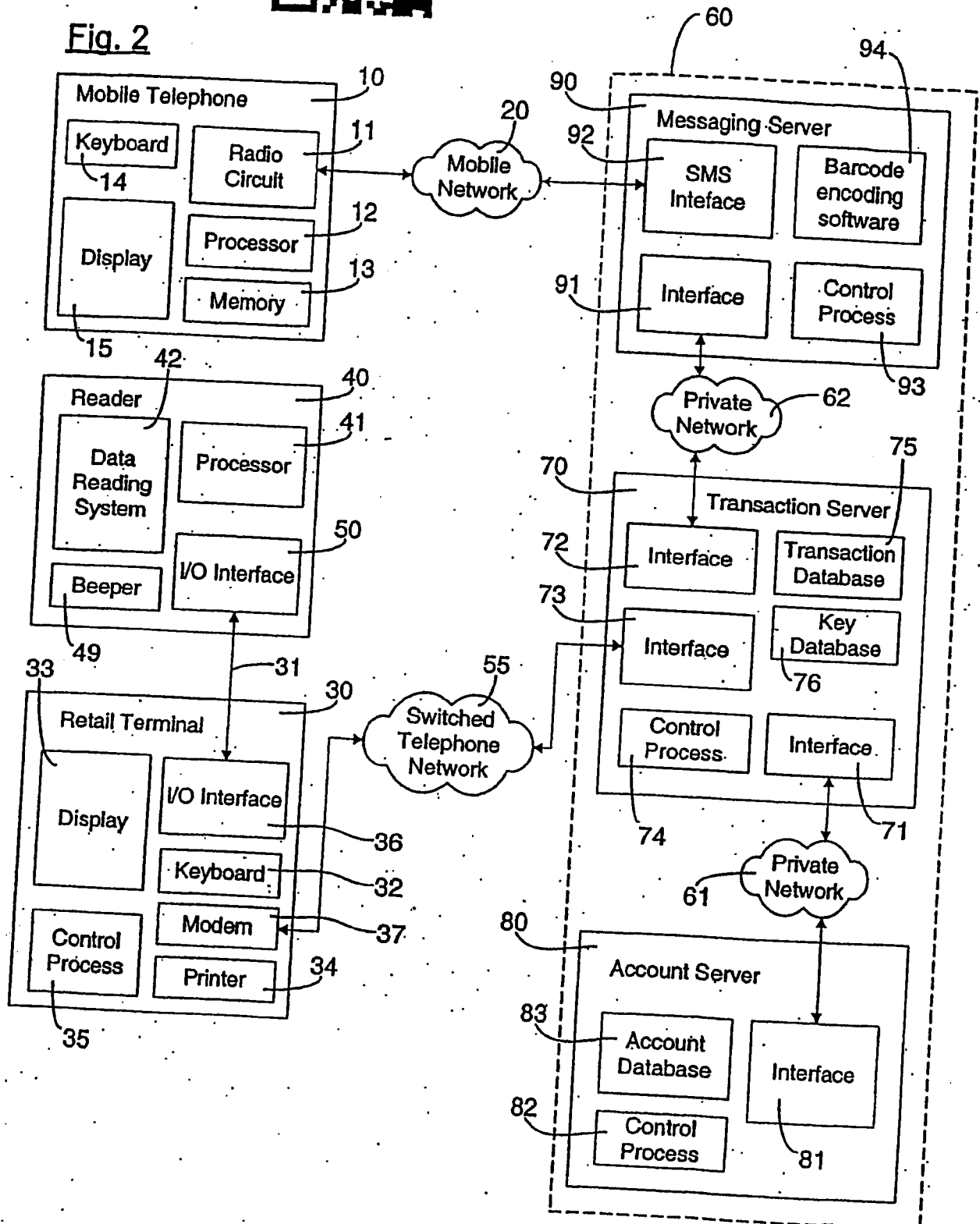
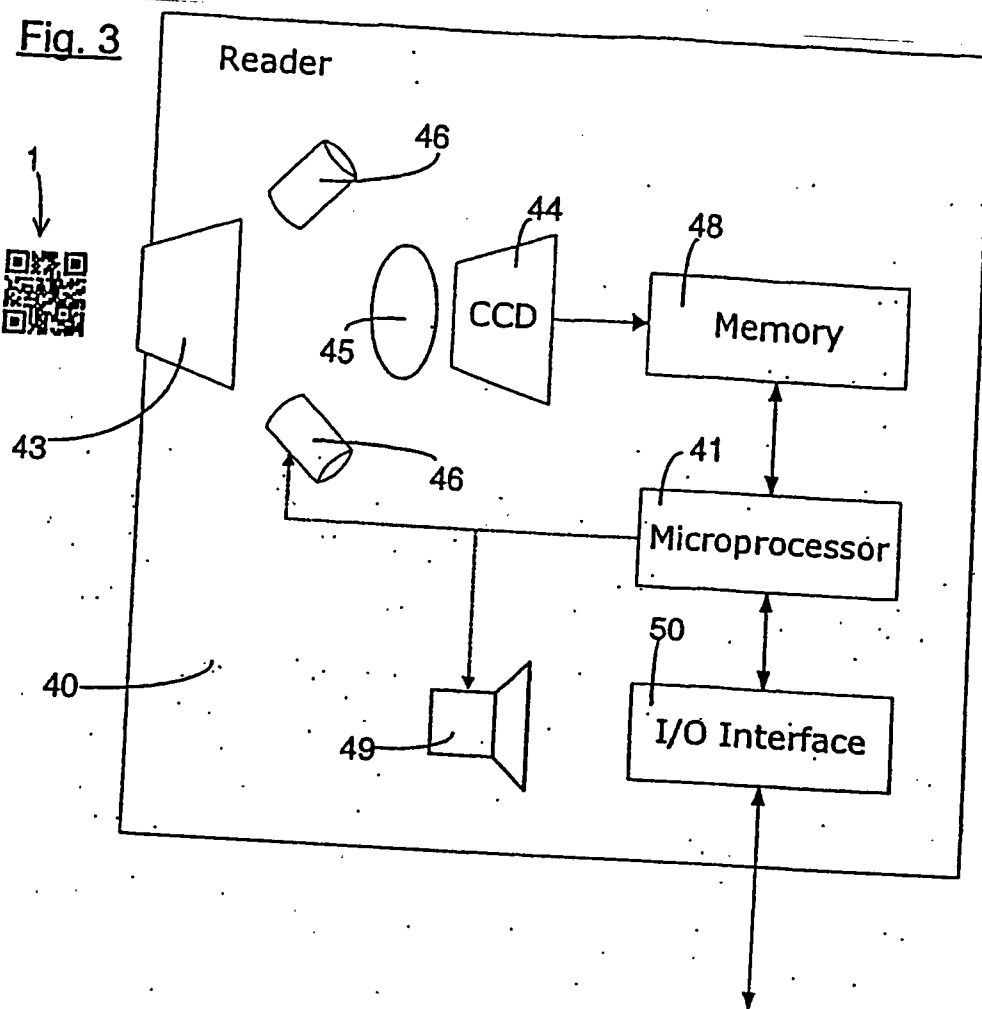
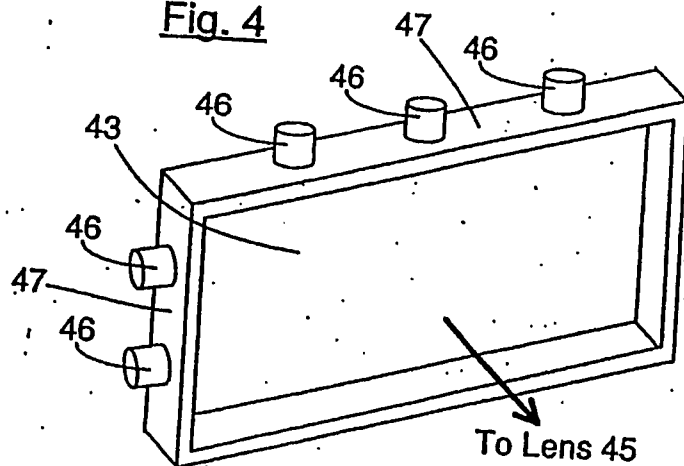


Fig. 3**Fig. 4**

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 03/05665

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 2001005883	A	12-01-2001	JP 3494613 B2 JP 2002157540 A	09-02-2004 31-05-2002
US 2003086545	A1	08-05-2003	WO 03047233 A1	05-06-2003
DE 10029333	A	03-01-2002	DE 10029333 A1	03-01-2002
WO 02093515	A	21-11-2002	WO 02093515 A2	21-11-2002

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

International Application No
PCT/IB 03/05665

Category *

Citation of document, with indication, where appropriate, of the relevant passages

Relevant to claim No.

A

WO 02/093515 A (TEICHER MORDECHAI ; CARDIS
INTERNAT INTERTRUST N V (NL))
21 November 2002 (2002-11-21)
claims 1-8

1-36



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TO:

COMPANY: InComm Europe Ltd.
FAX NUMBER: 011 44 1489588498
DIRECT PHONE: 011 44 1489556700

COMPANY:
FAX NUMBER:
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PHONE:

RE: U.S. Patent Application No. 10/539,461
Title: Payment System

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 ADDRESS VIA ORDINARY MAIL. THANK YOU.

EXHIBIT B

LoPresti, Marie

From: John Guest [JGuest@incomm-europe.com]
Sent: Tuesday, August 28, 2007 4:31 AM
Subject: Read: U.S. Patent Application Serial No. 10/539,461 entitled PAYMENT SYSTEM

Your message

To: JGuest@incomm-europe.com
Subject:

was read on 8/28/2007 4:31 AM.

LoPresti, Marie

From: LoPresti, Marie
Sent: Monday, August 27, 2007 1:45 PM
To: 'JGuest@InComm-Europe.com'
Subject: U.S. Patent Application Serial No. 10/539,461 entitled PAYMENT SYSTEM
Importance: High
Follow Up Flag: Follow up
Due By: Thursday, August 30, 2007 12:00 AM
Flag Status: Red
Attachments: Declaration.pdf

Dear Mr. Guest,

As you may or may not be aware, I have been trying to contact you by telephone regarding a Declaration that is due to be signed in connection with a US patent application entitled Payment System as referenced above.

My efforts to reach you by telephone have been unsuccessful. Therefore I am attaching hereto a copy of the Declaration for your convenience. Would you kindly sign the Declaration, fax a copy of the signed document to me at (401) 392-0391, and return the original to me at your earliest convenience.

Should you not intend to sign the Declaration, I would appreciate it if you would advise me of this as soon as possible.

I appreciate your assistance in this matter. Please feel free to contact me if you have any questions.

Thank you.

Kind regards,

Marie LoPresti
GTECH Corporation
10 Memorial Boulevard
Providence, RI 02903
Tel: (401) 392-7373
Fax: (401) 392-0391

8/27/2007